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THE WRITINGS OF MAURICEAU.

By Hunter Robb, M. D., *Professor of Gynæcology, Western Reserve University, Cleveland, Ohio.*

[*Read before the Johns Hopkins Hospital Historical Society, April* 8, 1895.]

François Mauriceau, Master of Arts, an ancient provost and guard of the company of sworn Master Surgeons of the City of Paris (for these are the titles which follow his name on the first page of his principal work), was born in the year 1637 and died in 1709. The accounts which we have of his life are very meagre, and it is quite possible that had he not lived at a time when the number of illustrious names added to the history of medicine was very small, he would have been almost unknown to posterity. Levret, however, says that Mauriceau "drew from the cradle" the art of midwifery.

In any case, when considering the principal works on midwifery and on the diseases of women which appeared during the 17th and 18th centuries, it would seem that his writings could hardly be passed over in silence.

Besides his 283 aphorisms, to some of which I shall refer later, he wrote a work on midwifery which passed through many editions. The title as it appears in an English translation by one Hugh Chamberlen, is as follows: "The Accomplisht Midwife, treating of the diseases of women with child and in child-bearing, and also the best directions how to help them in natural and unnatural labor, with fit remedies for the several indispositions of newly born babes, illustrated with divers fair figures and very correctly graven in copper. A work much more perfect than any yet extant in English, being very necessary for all teeming women, as also for physicians."

The edition which I have been reading was published in 1682, but the book appeared first in an incomplete form, as the author himself tells us, in 1668. It is dedicated with a great many stereotyped polite phrases to Antoine Daquin, who was the chief physician of Louis XIV. After the dedication we have the usual page of epigrams, one to the envious critic, another to the jealous ignoramus, both of which are by the author. The third, written by Dulaurens, is in praise of "François Mauriceau, the writer of a most useful book on child-birth."

In the preface the reader is recommended to approach the study of the work in a teachable spirit, for the author says, "As purgatives though excellent in themselves will not profit a body that has not been prepared for them, so books cannot instruct those who are not ready to receive instruction." He then goes on to compare the authors who had written on this subject before his time to geographers who have never seen the countries which they describe, and adduces his sixteen years practical experience as a proof that he knows of what he writes.

Possibly as a sort of bribe to his readers, he promises that in the last part he will reveal all the most profound secrets of the art, and while humbly acknowledging that there may be

some chaff among the wheat, he thinks that those who look for it will find in the book a sufficiency of good grain to reward them for their labors.

The work is divided into three books, which are preceded by an anatomical treatise on the female generative organs.

The first book treats of the different diseases of pregnant women from the time of conception to that of labor; the second book deals with labor itself; the third is devoted to a consideration of the puerperal state, and to the diseases of newly-born infants.

Perhaps the most striking thing about his anatomy is the mistake (which he persists in emphasizing more than once) in calling the ovarian ligaments "the true ejaculatory vessels which go from the testicles to the uterus." The Fallopian tubes also appear in his figures, but he takes pains to describe them as "the vessels which many esteem to be the only true ejaculatory vessels described by Fallopius under the name of tubes, or trumpets."

To the ovaries he ascribes functions analogous to those of the testicles in the male, but he says that they are formed differently, being made up of vesicles "which some moderns concede to be eggs without shells, which, after being fructified by coitus, some days later fall into the uterus."

He especially criticises the views of Graaf and his followers for saying that the human female possesses ova, and adds, "This sentiment ought not to be followed by other wise men for the reasons as well known to them as to me."

He incidentally mentions ovarian cysts and believes them to be due to some congenital malformation of the ovaries.

As I said just now, he believes that the ovarian ligaments are the real vasa deferentia because they go straight from the ovary to the uterus. The fact that they are solid tubes and not canals does not seem to have caused him any difficulty, since he argues that this will not at all prevent the sperm from trickling through. Believing as he did most thoroughly that the female contributes semen as well as the male, and being utterly opposed to the idea of the existence of ova, he could not see how the fluid could pass from the ovaries to the fallopian tubes, "seeing that the two are not connected."

He divides the uterus into four parts, the body, the internal opening, by which he meant the external os, the neck of the uterus or vagina, and the external orifice or vulva.

He corrects the measurements of Galen and other anatomists, and says that the length of the uterus from the vulva is not four but eight inches. He condemns Bartholini for saying that the uterus during pregnancy becomes thicker as well as longer, and quotes Galen and Vesalius to show that the pregnant uterus develops at the expense of the thickness of the walls, just as happens when the bladder expands as it fills with urine.

He did not understand that during pregnancy there is an actual increase in the number of muscular fibres in the uterus. He says that if an ewe be opened in the last days of pregnancy the fœtus can be seen through the transparent walls of the uterus.

In aphorism xxiv Mauriceau states that the vessels in the uterus develop in size during pregnancy. "If this be so," says Boivin, "and if the calibre of the vessels is augmented, why should the walls of the uterus become thinner? As a matter of fact the uterus loses little or nothing in thickness; this is a phenomenon of pregnancy which is most astonishing and admirable. It is true that the uterus can become thin at certain portions, especially those which are in contact with a prominent angle of the pelvis. Many causes may give rise to rupture of the uterus, and the viscus is not always distended in proportion to the size of the child."

Believing that the menstrual fluid was meant to nourish the child, he thought that blood came from pregnant women, whenever the supply to the uterus was more than was required to nourish the fœtus. He accounts in this way for the exceptional instances of menstruation during pregnancy.

He held that the uterus was supplied to a very great extent by the sixth pair of cranial nerves, which also went to the stomach, and thus finds an explanation for the various gastric disturbances occurring in pregnancy.

He bases the signs of virginity on the disposition of the four carunculæ, and says that "the membrane which some describe as lying within and across the vagina, and call the hymen," is pathological. He ridicules the idea that it is always possible to tell for certain as to the virginity of a woman, and quotes in support of his position certain verses from Proverbs, chapter xxx, interpreting them perhaps correctly, but upon this point I must plead ignorance.

He had evidently dissected animals, since he describes the uterus of some as containing several different cavities. Aphorism xx says "the uterus of a woman possesses only one cavity, and is different from that of most other animals, in which this organ possesses several small cells." Boivin's footnote is as follows: "Several cases of double uterus in women have been reported; I saw at an autopsy of a newly-born female infant a double uterus; each uterus possessed an orifice corresponding to a separate vagina; these two vaginæ ran together and terminated in separate orifices at the inferior commissure of the vulva; the same infant had several supernumerary fingers and toes."

The semen of a woman he holds to be an extract of the purest arterial blood elaborated in the ovary and containing a quintessence of all the parts of the body. He is highly indignant with those who deem the semen an excrement, when in reality it is the "master fluid of the body."

On generation he says, "Sperm from the male and female is necessary for generation, and both secretions must be prolific, that is, they must contain the idea and form of all parts of the body."

Aphorism lxiv says, "Sterility is usually due to some imperfection in the woman; for thirty sterile women one sees only one sterile male."

In speaking of sterility he lays much stress upon atresia as a cause of this condition, and recommends operation if constitutional measures are not successful.

He considers birth-marks to be due to some malformation in the blood-vessels, and ridicules the idea that the so-called strawberry marks are caused by drinking red wine during pregnancy, since "it is well known," he says, "that such things are seen in countries where nothing but white wine is taken."

He mentions an interesting case of a pregnant woman who nursed a child who had smallpox and afterwards bore an infant who had also the marks of smallpox. He fails to explain this phenomenon satisfactorily, but does not believe that it was simply due to mental emotion on the part of the mother.

Speaking of the signs of conception, he considers a slight pain in the region of the navel as of importance, and thinks that it is caused by tension upon the urachus.

The flattening of the abdomen in the first few weeks of pregnancy he attributes to the loss of flesh at this time.

He maintains that dropsy, although it may be mistaken for pregnancy, does not necessarily exclude the latter condition, and quotes the case of a woman who had dropsy for nine years and yet bore four children during this time. He speaks of the "incomparable science" of Democritus, who, judging only from the expression of the face, on one day saluted a girl as virgin and on the next day as woman, not knowing that in the interval she had been seduced; but later on he modifies this expression and says that it was probably more of a lucky hit on the part of Democritus than a scientific diagnosis.

He questions the statement of Hippocrates that while the male child is fully formed at the end of thirty days, in the case of a female child forty-two days are necessary, and thinks that both sexes receive a perfect form within the same period of time.

In aphorism lxxviii he says that "the whole body of the fœtus is formed from the first day of conception, and is then not larger than a millet seed; the remaining time of pregnancy serves only to give it the necessary growth."

He does not agree with Aristotle, who says "that the heart is formed first, but rather with Hippocrates, who says that no starting-point can be distinguished in the fœtus any more than in a circle which has no beginning."

He criticises Tertullian, who thought that the soul was evolved from certain essences in the semen, and, like a good churchman, believes that "the soul comes from without, and is fixed in the body of the child after it is fully formed."

The question of extra-uterine pregnancy gives him another opportunity for inveighing against Graaf and Fallopius. He gives an account of a case which was reported by a surgeon named Vassal. He claims to have made a drawing of the fresh specimen, asserting that the one usually accepted was made a month later, when the parts were much decomposed and mutilated by handling. According to his account the case was strictly speaking not one of extra-uterine pregnancy, but the fœtus had developed in a part of the uterus which had bulged out at the side, forming a kind of hernia. The picture which he gives would seem to favor his view if we could be quite sure that the round ligament was in the position in which he represents it to be (Fig. II).

Naturally on the subject of tubal pregnancy we should feel more inclined to take the views of men who knew which were the real tubes, and as we have said, on this point Mauriceau was not only mistaken, but has taken great pains to make it quite clear to us that he was in error.

In aphorism xxi he refers to this again. "The generation of the infant can very well take place near one of the corners of the uterus where the ejaculatory vas deferens called the tuba joins it, but it is impossible that generation should take place in the vessel itself." Boivin's note is as follows: "Proofs are not wanting that pregnancy has taken place both in the tube referred to by Mauriceau and in the ovary, and that the infant has developed there."

He gives various signs for diagnosing the sex of the fœtus in utero, but concludes that it is impossible to make a certain diagnosis. On this point he refers to several old superstitions, such as the one which taught that if conception takes place with the waxing of the moon a male child is engendered, whereas from a conception when the moon is waning a female child is to be expected.

He thinks that we can be more certain as to the number of children which a woman will probably bear at one time. Although he says that four is generally the limit, he reports many instances in which more were born at one birth, and until the number reaches fifteen he seems to think that such records are just within the bounds of possibility. But when he arrives at the history of a certain dame Marguerite, Countess of Holland, "who in the year 1276 was brought to bed of three hundred and sixty-five infants at one and the same time, who all received baptism and died on the same day together with their mother," he confesses, and not without reason, that we have reached the domain of fable.

He defines superfœtation as a "reiterated conception," and holds that this, as a rule, is impossible, "because after the first conception the mouth of the uterus is closed entirely and will not receive the semen of the male; yet exceptions may occur after the sixth day, but not before, since the first conception is not complete until after this period of time has passed; then, however, if the woman during coitus be intensely excited the cervix may open and the semen again enter the uterus."

He holds that twins as a rule are not instances of superfœtation, since they are born about the same time, and must therefore have been conceived about the same time.

The fifteenth aphorism is curious. "One sometimes sees weak and infirm women produce fairly healthy children, because the infant has in itself a peculiar principle of life which often purifies the nourishment which it receives from the mother, just as we see that the graft rectifies and renders milder the austerity of the sap of the wild tree on which it is grafted."

For the production of moles he holds the corruption of the sperm either of the male or female to be responsible, but he says that those occurring in unmarried women are not genuine moles.

In speaking of the so-called gaseous moles he seems to think that they are instances of physometra. For the differential diagnosis he gives us numerous points. (1) a mole has no active movement but is strictly passive; (2) on feeling the abdomen when the uterus contains a mole it will be found harder but more tender, and increases in size rapidly; (3) a mole being a dead weight is more trouble to carry than a living fœtus; (4) the bladder is more involved, but the breasts are not so much tumefied and do not contain much, if any, milk; (5) scirrhous growths and the menstrual blood are quite different from moles; (6) when a mole is cast out before the

second or third month it is called a false germ; these false germs are membranous, while moles are fleshy; (7) the movement of a mole is only like that of a dead weight in the abdomen; (8) a mole does not come from the uterus at term, although it is possible for a pregnant woman to have at the same time a mole in the uterus.

Aphorism lxvii says "the generation of a false germ in a woman previously sterile is generally a sign that she will be fruitful." Boivin adds, "the false germ or mole being the result of a degenerated conception, nothing is more certain than that the woman is apt to conceive."

His rules for the care of pregnant women are principally hygienic, although some of us might be inclined to think it rather severe that the pregnant woman should not be allowed to take a bath.

In aphorism xiii he expresses an opinion which has often been disputed, but with which, with certain modifications, the best authorities now agree: "Cinchona can be given with as much safety for the cure of fever to pregnant women as to other persons."

In aphorism viii he says that any serious operation like that belonging to a stone in the bladder and other serious conditions should never be performed upon a pregnant woman. To this statement Boivin makes an exception. "A stone in the bladder, if voluminous, could on the one hand interfere with the progress of the head and irritate and tear the bladder, and on the other hand might occasion inflammation of the uterus and cause the woman intense pain. It is better therefore to extract the stone before labor comes on."

He gives an interesting story of a tremor in the hands of an infant whose mother received a fright during her pregnancy; the baby was born prematurely and had a peculiar tremor of the hands, but otherwise was perfectly healthy; he grew up, and in due time he married; when signing the marriage contract some of the bystanders noticed that his hands shook very much, and not knowing of his infirmity they conjectured that "he felt nervous lest he should be making an unfortunate bargain."

He starts out by saying that the pregnant woman should not be bled, but modifies this statement in subsequent chapters, although he makes a great point of the fact that contrary to the prevailing opinion it is much safer to bleed in the earlier months of pregnancy than when it is far advanced.

The vomiting during pregnancy he looks upon in most cases as reflex in origin, and recommends only simple remedies unless it persists for a long time, when he thinks that it must be caused by morbid material adhering to the coats of the stomach, which should be removed by laxatives after the woman has been bled.

He deprecates the use of strong purgatives for fear of abortion. In speaking of vesical disturbances he seems to recognize the frequency of pseudo-incontinence, since after trying simple remedies he employs the catheter. Were it not that he looks upon the menstrual fluid as a source of nourishment for the fœtus, and consequently explains hemorrhages from the uterus and other parts of the body as being due to the fact that more blood is brought to the parts than the fœtus needs for its nutrition, his remarks on the subject of varicose veins and hemorrhoids, which he attributes generally to stasis in the veins caused by obstruction, are excellent.

He distinguishes three kinds of diarrhœa, (1) lienteric flux, (2) diarrhœic flux, (3) dysenteric flux, and says that any severe attack may induce an abortion.

He recognizes severe hemorrhage as a sign of impending abortion, but notes that in some cases the menstrual flow appears during pregnancy without any bad results. He thinks that when it appears in the first months it is usually caused by some false germ of which the uterus is trying to rid itself, but that when it appears in the later months it is probably due to partial separation of the placenta.

Unless the bleeding is excessive he would leave nature to take its course, but if there are signs of convulsions or syncope he insists that labor must be brought on artificially, "otherwise the woman will breathe out her last breath together with the blood."

He tells us a sad story of the death of his own sister, which he says "is still so vivid that the ink with which I write it to make it known in order that the recital may profit the public, seems to be blood."

He then cites several cases in which, by turning and immediate delivery, the lives of several patients who were having severe hemorrhages were saved.

He holds that dropsy of the uterus occurs in general abdominal ascites by the passage of the water through the porous substance of the membranes of the uterus, and that water is engendered in the uterus itself when it is debilitated by cold, violent labor, or by suppression of the discharges. To differentiate such a dropsical condition from pregnancy, he tells us that in the former the breasts will not be swollen and will contain no milk; no fœtal movements will be remarked at the proper time; the abdomen is generally distended; the color of the face will usually be bad; "these dropsies occur principally in sterile women, although it is possible for pregnancy to be accompanied by dropsy." He says, "When such women lose a quantity of water from the uterus it must not be mistaken for amniotic fluid, since the membranes will be found later to be unruptured."

He seems to use the term inflammation in the case of parturient women as synonymous with erysipelas; in fact he substitutes the word "inflammation" for erysipelas when quoting one of the aphorisms of Hippocrates.

It seems to have been a popular notion that a pregnant woman suffering from syphilis could not be treated for the disease until after the child was born. To this idea Mauriceau was strongly opposed, and quotes instances to prove that such cures had been effected, and that the only indication in such cases was not to carry the treatment beyond a mild salivation.

In speaking of the premature discharge of the fœtus from the uterus he makes four divisions: (1) effluxion, that is, the discharge of the contents of the uterus within six days after fruitful coitus, when the sperm had attained no consistence; (2) expulsion of the false germ up to the second month; (3) abortion, a discharge of the perfectly formed fœtus up to the beginning of the seventh month; (4) premature labor. "Whenever the fœtus is expelled after the beginning of the seventh month it is a labor."

Among the other causes of abortion he puts the various acute diseases.

In the second book he treats of normal and abnormal labor. Four conditions are mentioned as requisite to make a normal labor: (1) the birth must be at term; (2) it must occur without any particular difficulty; (3) the infant must be born alive; (4) the presentation must be favorable.

With respect to a normal presentation as described by Mauriceau, Boivin says "the head does not take this situation, that is, with the face looking downwards, except in the case of a third occipital presentation or at the end of the first stage of labor; but in the time of Mauriceau and for some time afterwards the mechanism of normal labor was still unknown, so that a presentation of the head was considered bad in which the face was not downwards."

He corrects the erroneous opinion held by Hippocrates that an infant born at eight months was likely to be more feeble than one born at seven months. This opinion was founded upon the idea that it was necessary for the infant to make efforts in order to be born, and that these efforts were first made at the end of the seventh month, so that if the infant did not succeed in escaping from the uterus he was necessarily enfeebled by his futile efforts.

Mauriceau explains that the uterus is the active and the fœtus merely the passive agent in the act of labor. In support of his views he refers to a book written by one Bonaventure, which he says is larger than the Bible and is entirely devoted to the proof of this one point.

The figures in his table of statistics, of which there are three, given to show the duration of the natural pregnancy, vary a great deal. According to these, gestation may last for eleven months and six days. He does not attempt to answer the medico-legal question as to how late a child may be born after the death of its father and still be considered legitimate.

In aphorism lxxxvi he says "pregnancy rarely goes beyond the tenth month; scarcely one out of a thousand of children born at the end of seven months survive; but half of those born at the end of eight months do well, if carefully nursed."

Aphorism lxxxiii says: "Some pregnant women feel fœtal movements after the end of the first month; many others do not feel them before the end of six weeks or two months; others again, only after four months." To this extraordinary statement Boivin objects that the smallness and the consistence that the embryo possesses at the end of a month and the quantity of water by which it is surrounded would render its movements imperceptible to the mother, and even at a later period she could very well confound the movements of the intestines with those of the infant.

He devotes a great deal of space to discussing the question whether the pubic bones separate during the act of labor, and throws discredit on the case of the celebrated Ambroise Paré, who at an autopsy upon a woman who was hung a short time after labor had found the bones separated to the extent of a finger's breadth.

In proof of his position he says: "If such a separation did take place the woman could not stand up immediately after labor," and incidentally we learn that his hospital patients were made to walk from the lying-in room to their bedrooms immediately after delivery.

The difficulty experienced by elderly women in their first labor he rightly attributes not so much to the want of yielding of the pubic joint, but rather to the ossification of the joints between the sacrum and the coccyx.

He distinguishes between false and true labor pains, and mentions the dilatation of the os and the bulging of the membranes as a sign of approaching labor.

He understood the nature and dangers of cases of placenta prævia. He holds that those who would make three membranes, the chorion, the amnion, and the allantois, are mistaken, since there are in reality only two, and these are really separated only with difficulty, the allantois being never seen in the human fœtus.

He regards the idea that an infant born in a caul is lucky as a mere superstition, except from the fact that the labor must necessarily have been an easy one.

It had been held by many authors that the waters were composed of the urine coming from the bladder by the urachus; but this Mauriceau says cannot be, since the urachus in the fœtus is not pervious. He quotes a noted anatomist named Gayant as a supporter of his own view. He holds that the waters are necessarily an exudation from the membranes, since they occur also in the case of false germs.

He evidently understood the uses of the amniotic fluid and denies that it serves as a nourishment of the child, as also the statement of Hippocrates that the infant sucks by the mouth its nourishment from the uterus. In support of this he quotes Aristotle, and shows besides that the waters have no nutritious qualities.

He gives a very good figure showing the placenta and umbilical vessels of the fœtus (Fig. III). He understood, apparently, that the blood from the vessels of the mother did not pass directly to those of the fœtus, and says that any severe indisposition on the part of the pregnant woman can give rise to pathological appearances in the placenta. That the knots in the cord signified the number of children to be born hereafter he declares to be a simple superstition.

In three figures he presents the different natural situations of the infant in the uterus when labor is to be normal. "The infant changes his position in the uterus during pregnancy. Towards the end of the seventh or eighth month the head, which heretofore has been above, takes up its position below, the fœtus having made a sort of a somersault. This perhaps accounts for the idea of some authors that the fœtus attempts to leave the uterus at the end of the seventh month."

He is opposed to the idea that women approaching their term should take much exercise, and more especially condemns the advice of Liebaut that they should go driving or ride a saddle-horse at a brisk trot, considering that such exercises, even when they do not cause miscarriage, are productive of malpositions.

He adds that baths are dangerous, not only on account of their too great humidity but also on account of the excitement which they cause and which may lead the mouth of the womb to open.

His directions for the conduct of a normal labor are on the whole excellent except those relating to the delivery of the placenta. They are about as follows: "When the symptoms of labor appear the rectum and bladder should be emptied. In strong women blood-letting may be practiced. An internal examination should be made from time to time in order to follow the dilatation of the os, and the genitals should be anointed with some emollient oil. Too many examinations should not be made. The woman should not be allowed to lie down too long in the first stage. Vomiting is not a dangerous symptom. The membranes should not be ruptured too soon. Many midwives, for fear of displaying ignorance, will not send for a surgeon sufficiently soon, and prejudice the poor women against them, calling them butchers and executioners."

"The woman should be allowed to choose her own posture for the second stage of labor. A feather-bed should not be used, and arrangements should be made to prevent the soiling of the bed-linen. Pressure on the abdomen should not be employed, though the os may be gently dilated by means of the fingers. No violence should be used in pulling upon the head, and direct traction should not be made, but rather a rocking motion from side to side."

"After the child has been born it is necessary to first see that there does not remain a second fœtus in the uterus. Even before tying or cutting the cord the placenta must be delivered. To do this, the midwife, taking two or three loops of the cord around the two fingers of her left hand and advancing the right hand near the vulva, makes gentle traction on the cord. Too strong traction must not be employed for fear of breaking the cord, in which case there may be a dangerous hemorrhage. Meantime the woman should be told to blow hard into one of her closed fists, or should put her finger down her throat in order to excite vomiting. A competent nurse may at the same time press lightly with the flat of her hand on the abdomen, employing friction. If these measures do not succeed, the hand must be introduced into the uterus and the placenta seized and taken away. Care should be taken not to leave any part of the placenta, any clots of blood or any false germs in the uterus. In the case of twins the placenta of the first should not be delivered before the second is born." The false germs would of course be remnants of the placenta, although Mauriceau says particularly that he has seen false germs discharged after the placenta has been delivered entire.

It is possible that he had often seen rupture of the cord following this method, since he devotes a chapter to the method of manual separation of the placenta after the cord had been broken.

He advises against the use of powerful drugs by the mouth to assist the expulsion of the placenta, and prefers extraction by the hand. He recognizes the necessity of bringing away all the membranes.

Besides normal labor he recognized three grades, (1) laborious or tedious labor, (2) difficult labor which is accompanied by certain complications, (3) abnormal labor, which is due to some malposition of the fœtus.

Of the last named he makes four main divisions, (1) when the anterior part of the body presents, (2) when the posterior part of the body presents, (3) when the lateral part of the body presents, (4) foot presentations.

He devotes a good deal of space to the description of the physical and moral character of the good obstetrician.

In speaking of the question as to whether the foetus in utero is still alive, he says that all the signs must be taken into consideration together, since each by itself is equivocal; the most trustworthy, however, being the recognition of (1) movements, (2) pulsation in the umbilical vessels or in the radial artery.

He is unwilling to allow the use of the hook by the midwife. He seems to have understood very well the operation of internal turning. Boivin says that his ideas on the subject were not original but had been described by Louyse Bourgeois. The forceps was unknown in Mauriceau's time.

In convulsions which are not easily controlled he recommends the induction of labor, and digresses to tell a story in which the operation was indicated but was performed too late to be of any service to the woman because the two priests who were present spent a whole day in discussing the question as to whether or no the baptism of the fœtus in utero was sanctioned by the church.

"Some authors," he says, "in foot presentations recommend turning on the head, but can tell us of no easy way of effecting this." He uses the hook in the extraction of the dead fœtus, and recommends if necessary the reduction in size of the head or body by means of a curved knife.

He devotes a whole chapter to the condemnation of Caesarean section on the living woman, and says that it is always fatal. He explains away cases of reported success by saying that they exist only in the imagination of the authors.

Caesarean section on the dead woman he considers not only lawful but necessary, and prefers to make a median and not the lateral incision recommended by many other authors.

Boivin, remarking on the aphorism which forbids Caesarean section on the living woman, says "this operation has rarely been successful; nevertheless, since it has succeeded sometimes, one should try this method of saving the mother and infant when no more certain means present themselves."

In Book iii he speaks of the care of the parturient woman and of the new-born babe. He forbids all tight bandaging and nauseating medicines, but allows a comfortable bandage and a light but nutritious diet. He warns us not to allow the woman to partake of the various delicacies which are usually prepared for the collation at the baptism of the infant.

He considers it a superstition that the wearing of the husband's shirt will produce the drying up of the milk. About post-partum hemorrhage, beyond recommending perfect rest (unless it be due to the presence of fæces in the bowel, in which case enemata should be given) he has not much to say.

He gives pictures of pessaries to support the prolapsed uterus after it has been put back into position. He himself preferred the ring pessary. He recognizes the error of Rousset, who would have us introduce the pessary into the cavity of the uterus itself, and adds: "This absurdity of Rousset, which he backs up with ridiculous arguments as if it was an interesting fact, would lead us to believe that he allowed himself to be deceived in the majority of fabulous stories which he puts down in the same book respecting Cæsarean section."

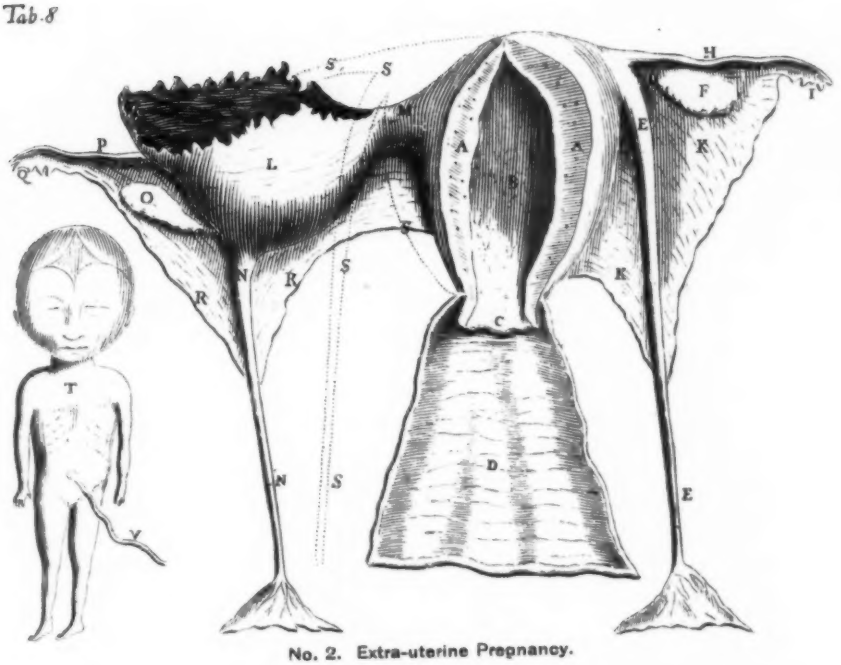
Fr.ois MAURICEAU

(Chirurgien),

Né à Paris le 1637.

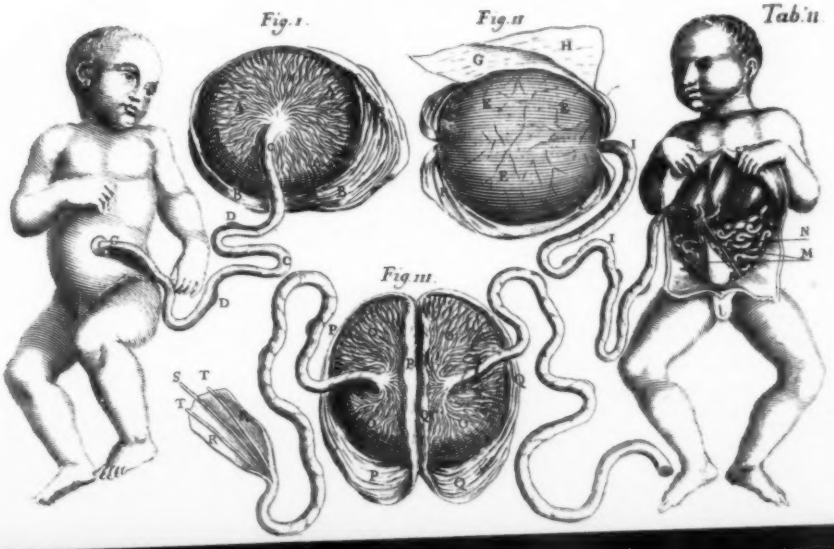
Mort le 27 Octobre 1709

Tab. 8



No. 2. Extra-uterine Pregnancy.

Tab. II



He speaks of prolapse of the rectum as sometimes occurring during labor.

He recommends the suturing of ruptures of the perineum at once, but speaks also of a later operation when it is necessary to freshen up the cicatricial tissues by means of the scissors or bistoury.

After-pains, he thinks, are due to gas in the intestines or to the presence of some foreign body, it may be a kind of false germ, a portion of the placenta, or clots of blood remaining in the uterus, or finally, by the sudden suppression of the lochia or by the overstretching of the ligaments.

Boivin notes that in speaking of the suppression of the lochia as placing a woman's life in danger, Mauriceau has mistaken the effect for the cause.

He recommends a good warm bouillon instead of the nauseating oil which was usually given in such cases. "Some midwives, under these conditions, give the woman a few drops of blood taken from the placenta; this is a mere superstition."

He also recommends hot fomentations and, above all, the removal of the foreign body if any be present in the uterus.

He seems to understand the nature of the lochia and gives a more or less correct account of the reasons for the change in color which occurs. He says that those who believe that the lochia consists of the milk of the breasts are ignorant of their anatomy, "since they should know that there is no channel which connects the mammæ directly with the uterus, unless indeed they suppose that it comes through the mammary vein which is supposed to unite with the epigastric vein, whereas as a matter of fact the epigastric vein does not connect with the uterus at all."

He understood that after the detachment of the placenta there was left a wound in the uterus which must have time to heal.

The sudden suppression of the lochia he says is very prejudicial to the woman. He seems to think, however, that it is often followed, and not rather preceded, by an inflammation of the uterus. He prefers bleeding from the arm to bleeding from the foot on these occasions.

He believes that scirrhus causes trouble by blocking up the uterus and preventing the passage of the normal excretions. He adds that a scirrhus can turn into a cancer and then become very painful.

"Cancer of the uterus is incurable because it cannot be taken away like a cancer of the breast. Cancer of the vulva can be cured by salivation, but when the growths are once in the uterus the treatment is of no avail." He probably mistook venereal for carcinomatous ulcers.

He understood that bad cow's milk was provocative of disease. He describes single and multiple abscess of the mammary glands, and gives pictures of nipple shields and general instruction about the nature and treatment of sore and retracted nipples. He condemns the custom of pressing back the blood from the cord into the infant's belly, since the blood, far from enriching that of the infant, is more liable to produce suffocation, since it is not vivified. He advises the placing of a compress over the fontanelle for several months.

His remarks upon the nursing of infants are excellent, except that he insists more than once that a mother should not be allowed to nurse her child for the first five or six days after birth.

He treats of the various diseases of young children in a very sensible way, and the chapters on indigestion, aphthæ, teething, chafing, and the venereal diseases are excellent and show the soundest common sense and good practice.

He had the right ideas about the occurrence of syphilis in infants, whether congenital or acquired, although we must differ with him when he says that a syphilitic woman should not be allowed to suckle her own child who is already syphilitic, but that a new nurse should be obtained, "although she is very apt to acquire the disease from the infant." This doctrine would seem very much in contradiction of that which he promulgated before, namely, that a woman's life is of more importance than that of a young child; and if her life, why not her health?

He closes with a chapter on the rules to be observed in selecting a wet nurse. Throughout the whole book he shows an intelligent conservatism. He shows that he must have possessed the power of observation and was not afraid to act when occasion demanded it.

A criticism of his aphorisms is also found in Levret's works.

From his writings we may picture to ourselves an honest, upright man, who, if not particularly brilliant, could safely be entrusted with the care of difficult cases, and who never allowed his common sense to be obscured by the various superstitions which prevailed in his time, by the greed for gain, or by the gratification of his personal vanity.

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THE PSYCHOLOGIC DEVELOPMENT OF MEDICINE.

By J. H. McCormick, M. D., *Washington, D. C.*

[*Abstract of paper read before the Johns Hopkins Hospital Historical Club, April 8th*, 1895.]

[A preliminary discussion of the independent evolution of culture concepts and the acquisition of a culture status by primitive peoples through mental evolution rather than by contact with other peoples, is omitted as of anthropological rather than medical interest.]

In the development or evolution of medicine, four stages are traversed—Imputation; Personification; Reification; and Scientific Explanation. By imputation is meant attributing to things powers and properties they do not possess. Personification is when these attributes are deified or personified. Reification is the designation of that stage in which these attributes are reified or made real; while in the last an attempt is made to give the true or scientific explanation. In proportion as the degree of culture advances we find medicine ascending from the lower to the higher of these stages, so that culture development is but a history of the healing art from empiricism based upon imputation, to scientific or rational medicine.

Among all primitive people everything is symbolic; their words and thoughts are expressed in symbols, and the unknown is expressed in terms of the known by this means; symbolism pervades everything everywhere. Since all practice is based originally upon some preconceived theory, and is the practical application of such theory, the history of medicine is the evolution of the mental conception of the cause of disease and of the action of the various agencies which govern or modify it.

How do primitive people formulate their theories? By observing nature in all of her protean forms and infinite variety. They are close students of nature and of natural phenomena, but are unable to see beneath the surface and, beholding that which is far beyond them, attribute it to some supernatural, some divine being who shifts the scenes and causes the changes of day and night to follow one after another.

Thus unknown forces and phenomena are ascribed to more powerful beings than themselves, having powers and attributes similar to their own but in a magnified degree. The mysterious movements of nature are operated and controlled by these supernatural personages, and hence are attributed to causes which do not exist. This is imputation.

To illustrate: the North American Indian believes the breath to be the spirit or soul, and this is how he arrives at such a conclusion.

On a cold frosty day the warm breath as it leaves the mouth is condensed by the cold air, forming a slightly visible cloud, and he observes that all living animals, both man and beast, emit this cloud, and that when dead this phenomenon does not occur, therefore he reasons this must be the spirit of life, and its absence denotes death. Again, he hears the thunder, and attempts to find in the living objects around something like it. He perceives that the growl of the bear somewhat resembles the noise of the thunder, therefore a great bear must have made the thunder, and what he hears is this animal growling in the heavens. When the breath is blown upon the hand a slight force or pressure is felt, and as a result, when the winds begin to blow it is but the bear-god sending forth his breath; if gentle, it is a life-giving, beneficent breath; if strong or forceful, it is an angry, death-dealing, destructive breath, showing that the sky-bear is filled with rage. The clouds are but the prototype of the breath of man, only being so much greater they must have come from the bear-god, who can render himself invisible.

This is imputation, in that he attributes to the bear the power of thundering and causing winds; conversely, when he hears the thunder he reasons that the bear causes it.

In time he notes that when it thunders a storm is about to break, cold, wind and rain follow, and the hunter becomes wet and cold, and from consequent fatigue and exposure takes cold; chills and fever, rheumatism and other diseases follow. This is the bear disease—for did not the bear cause it? For some reason, it may be, he has angered the wind-god or the rain-god, and thus their displeasure is visited upon him. To propitiate by prayers, gifts, sacrifices and the performance of ritualistic ceremonies is his chief hope of relief.

We will now consider the evolution of medicine as it has actually existed from the beginning to the present time, taking the four stages in order of their occurrence. It must be remembered, however, that while one particular stage predominated at any given time, even at first some degree of all was present, just the same as now.

Imputation.

Let us first endeavor to ascertain what was early man's conception of disease; for upon such conception depended his method of treatment; and in passing, attention is called to the fact that the same ideas, fundamentally, are found in every quarter of the globe, thus giving positive evidence in support of the statements and assertions made in the proposition which it is the province of this paper to demonstrate.

"Man," says Tylor, "as yet in a low intellectual condition, having come to associate in thought those things which he found by experience to be connected in fact, proceeded erroneously to invert this action, and to conclude that association in thought must involve similar connection in reality."

There are certain physiological functions, such as digestion and elimination of excretions, upon which the body depends for its existence, and when these are disturbed they give rise to pain or discomfort; and not knowing that such a departure from his normal condition is due to perversion of function, early man connects it with some mysterious power, a malevolent spirit.

After he has witnessed death and has recovered from the shock occasioned thereby, he seeks to find a reason for this sudden loss of energy and animation, and the failure to respond

to the demands made upon the one who was recently full of life and vigor.

Thus disease and death were caused by anger of offended external spirit, by supernatural powers of a human enemy, or by displeasure of the dead.

In India, Africa, China, the Pacific Isles and among the North American Indians, no natural death was recognized, but poison or witchcraft was the means by which all were removed.

The most powerful cause was the anger of the offended spirit. It has been already shown that the conception of the spirit or god is the natural sequence of the observation of natural phenomena; this idea is universal and forms one of the strongest proofs in support of the proposition to be demonstrated.

The septenary system of the Hindoo philosophy, so well described by Rhys-Davids, has its exact counterpart in the religious scheme of the North American aborigines. The vast collection of swastica made by Prof. Thos. Wilson shows the universality of this idea of the cross based upon the cardinal points of the compass, and is the result of a psychologic process.

The sun rises in the east and sets in the west. In front was the north, behind the south, above the sky, beneath the earth, and the centre around which all revolved was the abode of man. Can you not recognize the analogy to the ancient conception of astronomy in this?

If an east wind blew, the sickness was caused by the god of the east wind; if a man was sunstruck, the god of the south was enraged; if from the west or north, a like god was the cause. Propitiations and sacrifices followed as a logical result and were based upon their various beliefs relative thereto. The old method of punishment, found everywhere, of quartering the body had its origin in the offerings to the gods of the four ends of the world, and from this came the method of crucifixion, in vogue in many parts of the world.

In Lien-chow, province of Kway-oi, if a man strikes his foot against a stone and then falls sick, his family know it was a demon and offer wine, rice, fruit, incense and worship. Recovery follows.

Supernatural Power of Human Enemies.—Witchcraft, sorcery, practice of magic, voodooism and kindred practices are the imputed means by which an enemy inflicts disease upon his unwary victim.

Witches and wizards have exercised their uncanny and occult powers from time immemorial—a belief surviving among the negroes of our own Southern States, to say nothing of the Indians. In New England even, the practice of charging persons with being witches existed not much more than two centuries ago, and need not be here discussed.

I knew an old negro suffering from vertigo who declared it to have been caused by a witch, and an old woman with a large goitre which she claimed was due to the poisoning of a spring from which she drank. She thought the poison was placed in the spring by an old witch and was only toxic to her, because any one else could drink with impunity.

Displeasure of the dead was a fruitful source of disease. Ghosts, spooks, wraiths and unlaid spirits came back and, invested with power from the spirit-world, worked mischief upon those whom they thought had injured them in life. The mythology and folklore of every country and every age have teemed with legends of all these agencies.

Personification.

The transition from the stage just described to Personification is so gradual that no line of demarcation can be drawn. In the former the various natural phenomena were given as the cause of disease; in this, these agencies are deified or demonized.

"Sickness may be caused by invisible spirits inflicting invisible wounds with invisible spears, or entering men's bodies and driving them raving mad." Tylor, in his *Primitive Culture*, says: "As in normal condition, the man's soul inhabiting his body is held to give it life, to think, speak and act through it, so an adaptation of the self-same principle explains almost all conditions of body or mind by considering the new symptoms as due to the operation of a second soul-like being, a strange spirit." "The possessed man, tossed and shaken in fever as though some live creature were tearing and twisting him within, rationally finds a spiritual cause for his suffering and a name for it which it can declare when it speaks in its own voice and character through his organs of speech" (Vol. II, pp. 113–116).

This is widespread, for we find in China, Australia and North America, stones possessed by demons; and it is this spirit of evil and mischief, not the stone, which inflicts the injury. Among the Dyaks of Borneo, and in Cambodia, illness is due to the tormenting demon, while in Australia smallpox is caused by a black deformed demon. Woutan of Scandinavian mythology both causes severe illness and pestilence as well as cures them.

Assyrians and New Zealanders both believed in a demon for each part of the body.

In Ceylon the demon of disease was the son of a powerful king, whose wife, proving faithless to him, was ordered cut in twain, one part to be thrown to the dogs and one part to be hung in a tree. Before execution the queen said, "If this charge be false, may the child in my womb be born this instant a demon, and may that demon destroy the whole city and its unjust king." Nevertheless she was executed, but the severed parts immediately united and the child was born, and it went to feed upon the carcasses in the graveyard, and after a time brought disease upon the city.

The Israelites believed disease and death to be due to a destroying angel.

"Disease is still represented as evil influence to be exorcised. In the popular minds disease walks the earth as a devouring fiend and has a personality about it as of old. Our very phrases 'stricken with disease,' 'visitations and seizures,' are survivals of the conceptions of primitive times."

Among the Rosicrucians, disease was provoked by a spirit imprisoned in crystal. The natives of southwest Australia venerate pieces of crystal called "Teyl," which no sorcerer is allowed to touch, as it would cause the spirit to depart. Capt. Gray notices the accordance of this word in sound and signification with the "Baetyli," so celebrated in Pagan

antiquity, mentioned by Burder in his *Oriental Customs.* These stones were rounded and were supposed to be animated, by means of an incantation, by a portion of the deity. Magicians were supposed to be possessed with a power given them from the gods; in Syria the Witch of Endor (1100 B. C.) claimed to hold conferences with the dead.

In Hellas Ulysses visited the spirit-world, and men were turned into swine (400 B. C.).

In the consideration of the foregoing subdivisions, no treatment of disease in detail has been given, because the method of both was by imputation, and the consideration of special cases, as illustrations and corroborative testimony, will be more striking and better followed when the two are combined.

All treatment fell under three heads, dynamic or empiric, thaumaturgic or magical, and theurgic or by divine agency, and sometimes one method alone was used, but more frequently all three were combined in a single case. Usually they believed the efficacy of the drug to be due to some magic rite or formula which had to be performed or recited before the material was ready for use, and this principle did not exist at all in the agency to be employed, or was at least latent and the ceremony was necessary to implant it or render it active.

This is well shown by the customs of the Cherokees in gathering herbs for medicinal use. "The shaman goes provided with a number of white and red beads, and approaches the plant from a certain direction, going round it from right to left one or four times, reciting certain prayers the while. He then pulls up the plant by the roots and drops one of the beads into the hole and covers it up with the loose earth. In one of the formulas for hunting the ginseng the hunter addresses the mountain as the 'great man' and assures it that he comes only to take a small piece of flesh (the ginseng) from its side, so that it seems probable that the bead is intended as a compensation to the earth for the plant thus torn from her bosom. In some cases the doctor must pass by the first three plants met until he comes to the fourth, which he takes and may then return for the others. The bark is always taken from the east side of the tree, and when the root or branch is used it must also be one which runs out toward the east, the reason given being that these have imbibed more medical potency from the rays of the sun.

When the roots, herbs and barks which enter into the prescription have been thus gathered, the doctor ties them up into a convenient package, which he takes to a running stream and casts into the water with appropriate prayers. Should the package float, as it generally does, he accepts the fact as an omen that his treatment will be successful. On the other hand, should it sink he concludes that some part of the preceding ceremony has been improperly carried out and at once sets about procuring a new package, going over the whole performance from the beginning.

Herb-gathering by moonlight, so important a feature in European folk-medicine, seems to be no part of the Cherokee ceremonial. There are fixed regulations in regard to the preparing of the decoction, the care of the medicine during the continuance of the treatment, and the disposal of what remains after the treatment is at an end. Pretenders endeavor to impose upon the ignorance of their fellows by posing as doctors, although knowing next to nothing of the prayers and ceremonies without which there can be no virtue in the application."

Among the Chinese panax quinquefolia or ginseng is given to ward off or remove fatigue, invigorate the feeble, restore exhausted animal power, to make the old young—in short, to render man immortal. It is found in the mountains of Shantung and Leotung, but now most of it is imported from this country.

Its very name, ginseng, signifies the wonder of the world or the dose for immortality, and directions for gathering are upon the first two days of the 2d, 4th and 8th moons, when the stars are said to be propitious.

An investigation will prove the common belief that the aborigines were well versed in botanic medicine to be erroneous, as most of the plants used had no medicinal virtue and were used because of their supposed resemblance to some part or organ of the body, or again because the priest or physician had a dream to get this certain plant, and so it became fixed in the primitive materia medica. As before stated, none of these remedies were effective until some mysterious process had been performed and certain ceremonies were executed which had for their office the transference of power from the tutelary god to the plant. However, some remedies were used which were of great value, although all were subjected to the same ritualistic forms before using; yet a striking example of the union of both may be shown.

Since the days of Lister we have prided ourselves upon the excellence of our surgery as compared with that prior to the advent of antiseptics, yet centuries ago antisepsis was practiced upon the then undiscovered continent of America. A wound is inflicted upon the body of a warrior in battle or from accident upon the chase, and several days elapse before the wounded man is brought to his camp to be treated. The loss of blood, fever, accumulation of foreign matter at the seat of injury, have resulted in the formation of pus, and possibly sloughing has already taken place; the shaman and his assistants are summoned and the treatment begins. Beside a clear running brook a red willow grows, its roots bathed by the flowing stream. In a large cauldron the fresh roots of the willow are placed and covered with water from the stream and allowed to boil, and while it is boiling the shaman tells us that the spirit of the arrow has entered the wound which is decayed and dead. He believes that when an animal dies worms have entered and killed it, and because he sees them crawling in the putrifying mass he concludes that the worm has entered the wound of the patient and the flesh is dead.

The breath, which is white, is the spirit of the soul, and the blood, which is red, is the spirit of the body, and they both exist at the same time, as he well knows that when the white soul, the breath, ceases to come from the mouth, then the red soul, the blood, ceases to flow from the wound, and one cannot be without the other. So he takes the water, which is also white, and which also gives life, and the roots of the red willow which is watered by the stream, and is therefore a part of it and cannot exist without it (due to his observing that willows grow in wet and marshy places or along the banks of a stream), and the two make a red liquid by boiling, which resembles

blood and typifies the red soul. After prayers and sacrifices, etc., to the gods, the boiling liquid, now cool, is placed in the mouth of the shaman, and by blowing either directly from his mouth or by use of a reed he thoroughly cleanses the wound and blows into it the souls, white and red, and after dressing it to prevent the spirits from coming out before they have found their lodging place, the patient is allowed to rest. Thus he places or gives back the spirits which had departed, and he uses unknowingly an antiseptic solution, the active principle of which is salicylic acid.

The celestial bodies were supposed to have a great influence over disease, and the moon is in nearly all languages feminine, because of its coincidental relation to the functional activities of women, many of the diseases of women being ascribed to its baneful influence, and to avoid or relieve such maladies certain forms and rites are necessary.

Astrology accounts for many of the mysteries both of the cause and cure of disease. The collection of herbs at certain phases of the moon, and the planting of cereals or other crops must be upon the full of the moon, else, so they say, the fruit will turn to flower and the roots will shrivel and dry up. Moon-lore is too well known to enter upon at this point, although many examples bear directly upon the question at issue.

In the system of materia medica of the Chinese each organ had its specific remedy; thus, in a work written centuries ago, of which the following is a literal translation, this scheme was laid down:

"Of all roots that are produced, the upper half of what grows in the earth is known to possess the property of ascending the system, while the lower half has that of descending; as to the power of the branches, they medicinally extend to the limits of the body.

The peel or bark has influence over the flesh and skin; the pith and substance of the tree within the trunk operate upon the viscera; that which possesses light properties ascends and enters the region of the heart and lungs, that which is heavy descends and enters the region of the liver and kidneys; that which is hollow promotes perspiration, that which is solid internally attacks the internal parts of the system; that which is hot, but decayed, enters the breath, that which is mollifying enters the blood-vessels. Thus the upper and lower, the internal and external parts of a medicinal plant have each their corresponding effects on the human system."

For example, if you have a disease of the pleura or lungs you should take the bifurcated root of the mandrake, because it looks like a man, cut out the part which corresponds to the thorax and apply in a poultice to the chest.

For this reason fox's bones and otter's livers were given in consumption, and hart's and rhinoceros's horns, tiger's and elephant's bones were excellent in extreme weakness to strengthen and fatten the body, and a dose of tiger's bones was thought to impart courage.

In nearly every country the idea prevails that decayed teeth are due to the presence of a worm, which, as Cushing will show in an article to be shortly published, arises from their observance of worms in decaying animal and vegetable matter.

The Indian believes rheumatism to be due to a worm in the limb of the afflicted individual, or sometimes to the spirit of slain animals, usually the deer, thirsting for vengeance on the hunter.

This latter theory is clearly shown in stories told of poisoned arrows. It is well known that early man had no knowledge of toxicology as such, but seeing persons or animals die from the effects of certain agents, thought death to be due to a spirit going into the man. When a man died from the bite of a rattlesnake it was believed to be the spirit of the rattlesnake entering the body which produced this result. Accordingly, if one wished to destroy his enemies he induced the spirit of the serpent to act for him by the following process: A snake was killed and the arrows or other weapons were placed in the blood in a circle, and by prayers and incantations the spirit went into the missile and could be transmitted to the body of the victim.

The treatment of rheumatism illustrates the three methods. Among the Pueblo Indians a patient crippled, drawn up and twisted by this disease is given a decoction of the young shoots of the fern, because when young and tender they are curled up like the sick one, and as they grow they unfold and become straight, and therefore they cause the partaker to unfold and become straight. But this is not all: the fern is straight, but it cannot bend forward and backward except it be broken, and it alone would cause the sufferer to remain forever straight, unable to bend. To remedy this the measuring-worm is given mixed with the fern, as he not only has the power to straighten himself from his curled-up position, but he can resume it again at his pleasure.

The thaumaturgic or magical method is fertile in its resources, but only one is necessary, the wearing of magic charms, amulets, and cords or girdles. The use of iron crosses, rings and cords survives to-day, and a common practice among the negroes is to tie knots in a cord equal to the number of letters in the name.

The following formula and explanation for the treatment of rheumatism among the Cherokees is so interesting and illustrative of many points already noted that it will be given at some length. In the prayer reference is made to the "Great Ada'wehi," which is a term used to denote one supposed to have supernatural powers, and is applied alike to human beings and to the spirits invoked in the formulas.

Formula for Treating the Crippler (Rheumatism).

Listen! ha! in the sun land you repose, O red dog. O now you have swiftly drawn near to hearken. O great Adá wĕhĭ, you now never fail in anything. O appear and draw near running, for your prey never escapes. You are now come to move the intruder. Ha! You have settled a very small part of it far off there at the end of the earth.

Listen! ha! In the frigid land you repose, O blue dog. O now you have swiftly drawn near to hearken. O great Adá wĕhĭ, you never fail in anything. O appear, etc. [Like above.]

Listen! ha! In the darkening land you repose, O black dog, etc.

Listen! On Wa hala you repose, O white dog, etc.

Listen! On Wa hala you repose, O white terrapin. O great Adá wĕhĭ, you never fail in anything. Ha! It is for you to loosen its hold on the bone. Relief is accomplished.

(Prescription.) Lay a terrapin shell upon (the spot) and keep it there while the five kinds (of spirits) listen. On finishing, then blow once. Repeat four times, beginning each time from the start. On finishing the fourth time then blow four times. Have two white beads lying in the shell together with a little of the medicine. Don't interfere with it, but have a good deal boiling in another vessel—a bowl will do very well—and rub it on warm while treating by applying the hands. And this is the medicine: What is called Yă'na-Utsĕ'sta ("bear's bed," the Aspidium acrostichoides or Christmas fern); and the other is called Kă'ga-Asgû'ⁿtagĭ ("crow's shin," the Adianthum pedatum or Maidenhair fern); and the other is the common Egû'li (another fern); and the other is the little soft (leaved) Egû'li (Osmunda cinnamonea or cinnamon fern), which grows in the rocks and resembles Yanâ-Utese sta and is a small and soft (leaved) Egû'li. Another has brown roots and another has black roots. The roots of all should be (used).

Begin doctoring early in the morning; let the second (application) be while the sun is still near the horizon; the third when it has risen to a considerable height (10 a. m.); the fourth when it is above at noon. This is sufficient. (The doctor) must not eat, and the patient also must be fasting.

Explanation.—The disease, figuratively called the intruder (ulsgéta), is regarded as a living being, and the verbs used in speaking of it show that it is considered to be long, like a snake or fish. It is brought by the deer chief and put into the body, generally the limbs, of the hunter, who at once begins to suffer intense pain. It can be driven out only by some more powerful animal spirit which is the natural enemy of the deer, usually the dog or the wolf. These animal gods live up above beyond the seventh heaven and are the great prototypes of which the earthly animals are only diminutive copies. They are commonly located at the four cardinal points, each of which has a peculiar formulistic name and a special color which applies to everything in the same connection. Thus the east, north, west and south are respectively the sun land, the frigid land, the darkening land, and Wă'hală', while their respective mythological colors are red, blue, black, and white. Wă'hală is said to be a mountain far to the south. The white or red spirits are generally invoked for peace, health and other blessings, the red alone for the success of an undertaking, the blue spirits to defeat the schemes of an enemy or bring down troubles upon him, and the black to compass his death. The white and red spirits are regarded as the most powerful, and one of these two is generally called upon to accomplish the final result.

In this case the doctor first invokes the red dog in the sun land, calling him a great adâwehi to whom nothing is impossible and who never fails to accomplish his purpose. He is addressed as if out of sight in the distance, and is implored to appear running swiftly to the help of the sick man. Then the supplication changes to an assertion, and the doctor declares that the red dog has already arrived to take the disease and has borne away a small part of it to the uttermost ends of the earth. In the second, third and fourth paragraphs, the blue dog of the frigid land, the black dog of the darkening land, and the white dog of Wahala are successively invoked in the same terms, and each bears away a portion of the disease and disposes of it in the same way. Finally, in the fifth paragraph the white terrapin of Wahala is invoked. He bears off the remainder of the disease, and the doctor declares that relief is accomplished.

The connection of the terrapin in this formula is not evident, beyond the fact that he is regarded as having great influence in disease; and in this case the beads and a portion of the medicine are kept in a terrapin shell placed upon the diseased part while the prayer is being recited. The beads are white, symbolic of relief.

The blowing is also a part of the treatment, the doctor either holding the medicine in his mouth and blowing it upon the patient, or, as seems to be the case here, applying the medicine by rubbing, and blowing his breath upon the spot afterwards. In some the simple blowing of the breath constitutes the whole treatment.

The medicine consists of a warm decoction of the roots of four varieties of fern, rubbed on with the hand. The awkward description of the species shows how limited is the Indian's power of botanic classification.

The application is repeated four times during the same morning, beginning just at daybreak and ending at noon. Four is the sacred number running through every detail of these formulas, there being commonly four spirits invoked in four paragraphs, four blowings, with four final blows, four herbs in the decoction, four applications and frequently four-day tabu. In this case no tabu is specified beyond the fact that both doctor and patient must be fasting. The tabu generally extends to salt or lye, hot food, etc., while in rheumatism some doctors forbid the patient to eat the foot or leg of any animal, the reason given being that the limbs are generally the seat of the disease. For a similar reason the patient is also forbidden to eat or even touch a squirrel, a buffalo, a cat or any animal which humps itself. In the same way a scrofulous patient must not eat turkey, as that bird seems to have a scrofulous eruption on its head, while ball-players must abstain from eating frogs, because the bones of that animal are brittle and easily broken.

Reification.

There comes a time in the civilization of every nation when medicine and religion are divorced. For one or another reason, usually peculiar to each individual community, there is a breaking away from the ecclesiastical power which holds all knowledge within its jealous embrace, and the people learn to investigate for themselves. The old superstitions and beliefs of supernatural powers in man give way before the evidence to the contrary in the physical world. This is the time when men go to the other extreme and say everything was created for a purpose, and they gather together a vast collection of half truths, due to erroneous and imperfect methods of investigation, and necessarily place a wrong construction upon them.

This accounts for the impetus given to the study of medicine in Europe in the middle ages; but we find centuries later that a thousand years before the Christian era, in China, almost the same ideas existed, just as the independent discovery of printing and art of making gunpowder.

They believed that the body was composed of water, fire, wood, metal and earth, the five elements of which everything was composed. So long as the equilibrium was maintained

between them the person enjoyed health; as soon as one predominated, sickness ensued. To discover and then counteract that which predominated was the treatment. Inflammation was due to excess of fire. Distortion of eye and mouth was due to the excess of wood over metal which contracted the muscles. Under such circumstances, earth discharged its nature, its power relaxed in the interstices, the eyes became hollow and muscles contorted.

Their knowledge of anatomy was slight and superficial. Reverence for the dead forbidding dissection, until a much later period, their only knowledge was derived from animals, and curious enough, this same respect gave them a knowledge of osteology, as the bones were often arranged and preserved with scrupulous care by relatives and friends. The great viscera of chest and abdomen were known, but their relative positions were not. The heart was supposed to lie on the right side and the liver on the left. The circulation of the blood was known, but they were ignorant of the part played by the lungs in its purification.

"Throughout the human body a vivifying ethereal fluid was transfused, which was called *Ke* and resembled the ether of nature. According to the best ancient authors, water entered the body through the mouth. Beside the natural way of evacuation, it was either absorbed during cold weather by the Ke, or in hot weather it came out as perspiration; when grief oppressed the mind it appeared in shape of tears or was given out as saliva."

When the Ke was vitiated its ejection was obstructed, it accumulated and dropsy resulted, and a cure was effected by evacuation of water.

Their imperfect knowledge of the circulation gave rise to one of their most singular notions, the doctrine of the pulse.

The native physicians now say that owing to their delicacy of touch they can distinguish no less than 24 different kinds of pulse, and declare that for every part of the body there is a pulse peculiar to that particular locality. In the arm there are 3, the inch, the bar and the cubit; the liver has its pulse located in the right wrist, while the left governs the heart, and by examining the pulse in the various parts of the body they can tell disease and its cure; also whether a woman will give offspring and whether it will be male or female. Among the Turks and other Mohammedan people a similar doctrine is found.

The nose is the part of embryo which is first formed, hence in literature the nose ancestor was the designation of the original founder of a family.

Plato and Proclus had faith in the pentad or five (5) principles of nature, the 5 planets known to them presided over the five viscera, the 5 elements, 5 colors and 5 senses.

Mars was hot and dry; medicine bitter, red in color, affected the heart. Green medicine came from wood and operated on the liver. Red medicine came from fire and operated on the heart. Yellow medicine came from earth and operated on the stomach. White medicine came from metal and operated on the lungs. Black medicine came from water and operated on the kidneys.

The pentad and duad were the mysterious numbers of the Chinese as well as of many other nations. The *yang* and *yin* or male and female energies in nature, the active and passive agents, form an important part in every department of Chinese learning, for they believe every phenomenon can be explained by these obscure and awful principles.

Yang, or male principle, is hot, cold, warm, or cooling; yin, or female energy, is sour, sweet, acid, or salt. The blood is of two kinds, yang or arterial and yin or venous; the first is strong, the latter is slight; the yang circulates throughout the body, while yin nourishes the soul and most of the bones and sinews.

Galen and Paracelsus, while retaining many of the beliefs noted in imputation, started on the long journey toward truth and reached the stage of reification, and their investigations and teachings left their impress for many generations.

They believed the brain to be a cold, inert gland whose function was to secrete a phlegm. The heart sent forth animal spirits, and the body was composed of four fluids, bile, blood, atrabile and phlegm.

Galen explained functional acts by forces or faculties; for example, food is conveyed to the stomach by an attractive faculty, is kept there by a retentive faculty, until it is converted into chyme by an alterative faculty, made to pass into the duodenum by an expulsive faculty, to be taken up by the veins and carried to the liver, where it was converted into blood by a blood-making faculty.

The four systems of Asellius became widespread in their influence, the chemical, iatro-mechanical, spiritual, and vital. There were five crises in the chemical: *ens astrale*, or influence of the stars; *ens veneni*, or poisonous principles of food and drugs; *ens naturale*, or force which directs the microcosm; *ens spirituale*, or spiritual principle, whose action is seen in sympathy and antipathy; *ens Dei*, the spirit of God, which sends disease as a chastisement.

An analogous doctrine is found in the five principles of the Hindus, the elements of earth, air, fire, water and ether, from which the ancient philosophers of Greece derived their doctrine of the elements.

It must be borne in mind that the spirits referred to in this connection are not the same as were mentioned under the first two subdivisions, but are regarded as a physical or tangible force.

Although much of the imputed in medicines remained, yet it had a different signification. While the lights of a fox in wine (the fox being long-winded) or bear's gall in water were of great virtue in asthma, and wine in which the feet of a yellow hen have washed was a sure cure for jaundice, the remedies were regarded as having something of definite action, of a physiological or chemical nature, the exact character of which was not definitely understood.

Empiricism was in the heyday of its success; everything was used that could be used, and the extent and variety were simply appalling. Wolf's liver steeped in wine for cough, cow's blood in vinegar for spitting of blood, burnt deer's horn for fluxes. Phrenitis was cured by attaching a sheep's lights while yet warm to the patient's neck.

Diseases of the ear were treated with wormwood, rue, ants, earthworms steeped in vinegar and eel's blood boiled in wine. Moss from the skulls of animals and the powdered

thigh-bone of noted criminals were in high repute. The following prescription of Paracelsus, known as Paracelsus plaster, would be a boon to dermatologists in curing malignant growths, but unfortunately its method of preparation has become one of the lost arts:

℞ Take a quintessence of all of the gums in the world.....½ lb.
Magistery of the magnet .....1 oz.
Elements of the fire of amber (that is, the electrical fluid).1 lb.

And of such great strength was it that it was known to have pulled rocks of some size from their bed in the soil.

"There remains in the people a belief in the efficacy of drugs as drugs—a belief that for every bane there must be an antidote, so for every disease there must be a curative leaf or root."

From this step to the last an imperceptible change takes place; a gradual accumulation of indubitable facts brings us to that stage where all is demonstrated, all is logical, all is final, as far as it is possible to carry human inquiry, and the questioner is stilled, for all his queries are answered, or if not answered, he is satisfied that he is in the right path and by diligent pursuit will eventually reach the goal. This is the fourth or scientific stage.

Scientific Explanation.

What need be said further upon this point? Its history is our own history, its work is what we have and are doing, its aim, scope and outlines are well defined. We have but to correct the errors of the past and demonstrate things as they are.

PERITONITIS CAUSED BY THE INVASION OF THE MICROCOCCUS LANCEOLATUS FROM THE INTESTINE.*

By Simon Flexner, M. D., *Associate in Pathology.*

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The conditions which underlie the causation of acute peritonitis have been the subject of so many studies during the past few years that many of those favoring or inhibiting its development are now well known. The experimental investigations of G. Wegner, Grawitz, Halsted, Barbacci, Tavel and others have conclusively shown that the healthy peritoneum possesses the power not only of rapidly absorbing or otherwise disposing of sterile fluids and solids, but also of disposing of a large number of saprophytic and pathogenic bacteria when these are introduced in such a manner as to avoid greatly injuring the tissues themselves. In order that pathogenic bacteria, introduced directly into the peritoneal cavity, may cause a peritonitis, general or circumscribed, evanescent or fatal, the normal conditions of the peritoneum must in some way be modified so as to afford an opportunity for the development of the bacteria. Measures which vitiate the vitality of the endothelial lining of the cavity, or which remove the organisms from the destructive action of the fluids and cells of the peritoneum, accomplish, as a rule, this result. Thus it is found that certain sterile soluble toxic substances, whether derived from the growth of bacteria or from the intestinal contents, permit, when introduced along with pathogenic bacteria, the growth of the latter; and this is doubtless, in part at least, due to the injurious effects which the toxic agent exerts upon the covering endothelial cells. Solid foreign bodies, which are themselves not capable of setting up inflammatory changes, afford, when introduced along with the micro-organisms, a nidus suitable to their increase; and bits of strangulated tissue, as for example the omentum, do likewise; and both of these doubtless act by affording a place of settlement for the bacteria removed from the action of the living cells and fluids, permitting them to manufacture one of their chief weapons of offence, their toxines, and thus to provoke an acute peritonitis.

These two sets of conditions illustrate what commonly happens in the occurrence of peritonitis in human beings, in whom, it is to be assumed, the factors are not radically different from those in our experimental animals. And upon analysis it is found that most cases of peritonitis can be brought into one or the other of these categories.

The most frequent cause of peritonitis is perforation of the intestine, an accident which permits the ingress of the intestinal contents into the abdominal cavity, these contents carrying both the necessary foreign substances and the infecting micro-organisms. Lesions of the intestinal wall of a non-perforating character permit, as has been shown by Dr. Welch for the bacillus coli communis, not infrequently the escape of this organism into the peritoneum and elsewhere in the body. The alterations in the intestinal wall need not for this purpose be of a severe grade; congested areas and small hemorrhages in the mucosa often suffice. Not all, however, of these escaped organisms produce a peritonitis; indeed, in the majority of instances peritonitis does not develop. Netter has found that in most cases of fatal acute lobar pneumonia, coverslip preparations made from the glossy and uninjured serous coat of the abdominal cavity will show the presence there of the micrococcus lanceolatus, an observation which I have in several instances been able to confirm. It must be clear then that in human beings, as in experimental animals, some other condition than the mere presence of pathogenic micro-organisms in the abdominal cavity is necessary in order that peritonitis may be produced.

I conceive that if it is possible, in view of a lesion of the intestine, for micro-organisms to penetrate beyond the cavity of the intestines, to enter the mucosa itself and later to invade the deeper structures and finally appear in the peritoneal cavity, that the way is also opened for the escape of soluble sub-

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stances into this cavity from the interior of the intestine, these substances being in part the products of the growth of the bacteria there present and in part of the chemical changes taking place in the ingesta. That these soluble products may in themselves, independently of bacteria, cause inflammation is shown by the existence of a fibrinous exudate upon the serous coat of the intestines enclosed in hernial sacs without bacteria (chemical peritonitis); and conversely, the presence of bacteria in the hernial fluid does not necessarily involve the development of peritonitis.

The existence of chronic inflammatory changes such as thickenings of the peritoneal coat and adhesions between neighboring viscera, are certainly not inconsistent with the assumption, in these parts, of an abnormal or lessened vital resistance.

Therefore it would seem as if these two conditions, namely, the opportunity for the escape from the interior of the intestine of soluble chemical substances into the abdominal cavity, and the pre-existence of chronic inflammatory changes, might become important factors in the development of peritonitis, the presence of the infecting micro-organism being assumed. And the recognition of their predisposing effect might serve to bring into better harmony the observed facts in human pathology with the results of experimental investigation. The following cases are offered as illustrating the effect of these two factors.

Another factor of great moment in the development of acute inflammations of serous surfaces is the alteration of the fluids and cells of the body which takes place in the course of chronic heart, liver and kidney disease. This topic, however, has no especial bearing upon this paper and will be dismissed here.

In the light of these considerations it becomes clearer why the colon bacillus, the micrococcus lanceolatus, and perhaps still other pathogenic bacterial species may be sometimes present in the peritoneal cavity without doing harm there, although the study of the ætiology of peritonitis has shown that both of these organisms may be involved in its development. In passing, however, it may be stated that the bacillus coli communis is perhaps not so often concerned alone in the causation of peritonitis as has been supposed, but it is oftener associated with other micro-organisms, particularly streptococci and pneumococci.

The micrococcus lanceolatus has been found as the only organism present in acute peritonitis by Barbacci, Weichselbaum, A. Fraenkel, Sevestre, Courtois-Suffit, Netter, Gaillard, and Wright and Stokes. To their reports I now wish to add two cases.

The first case was a mulatto child, 3½ years of age, who was admitted into the medical service (Dr. Osler) of the hospital on Nov. 6th and died on Nov. 12th, 1892. At the time of admission the child had been ill for one week. At the first examination the abdomen was found to be distended and tympanitic, and there was evidence of some fluid. The urine was turbid, specific gravity 1010, it contained much albumen and hyaline and epithelial casts.

The autopsy was made six hours after death. Anatomical diagnosis: Chronic diphtheritic dysentery, acute exacerbation; fibrino-purulent peritonitis; broncho-pneumonia; acute nephritis; general anasarca. General infection of the body with the micrococcus lanceolatus.

Only that part of the protocol relating to the intestines and abdominal cavity is given. The solitary follicles of the jejunum were enlarged, and the patches of Peyer in this situation less so. In the ileum the Peyer's patches were more distinctly swollen, and areas in which the mucosa was hyperæmic were here present. In the region of the ileo-cæcal valve the intestine was much congested, and small deposits of fibrin were to be seen. The large intestine was thickened, and in the mucosa were many pigmented, slate-colored spots and small ulcerations. A small amount of a white, opaque exudate, very adherent, was applied in this region to the surface of the mucosa. This exudate did not make at any place a continuous layer, but was composed of separate dots hardly exceeding each the size of a pin's head. The peritoneal cavity contained a considerable amount (several thousand cubic centimeters) of a very thin, opaque and milky fluid in which small flocculi floated. The serous coat of the cavity and of the intestines was hyperæmic and covered with a layer of fibrin mixed with pus cells.

This exudate examined microscopically showed enormous numbers of a capsulated coccus, occurring chiefly in pairs, which was proven to be the micrococcus lanceolatus. The number of pus cells in the fluid was not very large, so that the turbidity of the fluid seemed in part due to the large number of micro-organisms present. The same organism was cultivated from the spleen, liver and kidneys. It was found in sections stained, with Weigert's fibrin stain, to be present in the lumen of the intestine.

The second case was a colored woman, 40 years of age, who was admitted to the gynæcological ward (Dr. Kelly) on March 10th last. At this time she complained of great abdominal pain and dyspnœa. She dated her present illness one week prior to admission; the onset was with a chill, the abdominal pain appearing some days later. Upon admission the abdomen was only slightly distended in its lower zone, but it was excessively tender. On percussion there was tympany over the entire abdomen. The second day after admission the distension had increased and the tenderness became more pronounced. Temperature fluctuated between 101° and 102.5° F.; pulse quick. The vaginal examination showed the presence in Douglas' cul-de-sac of a mass the size of an enlarged fundus uteri. An exploratory incision was made by Dr. Clark on March 12th. The much distended intestines immediately extruded themselves through the opening. They were hyperæmic and covered with a thick layer of fibrin and pus. The peritoneal cavity was flooded with sterilized salt solution, the pelvis packed with gauze (a ruptured pyosalpinx was suspected) and the incision in part closed. Death occurred on March 14th at 1.30 P. M.

Autopsy, March 14th, at 4 P. M. Anatomical diagnosis: Diphtheritic entero-colitis. Acute fibrino-purulent peritonitis; extension into the pleural cavities. Chronic pelvic peritonitis; hydrosalpinx. Acute spleen tumor. Parenchymatous degeneration of viscera.

An abstract of the protocol is as follows: Body well nourished; in the median line of the body, beginning 10 cm. below

the umbilicus, there is a linear incision, closed in its upper part with sutures, the lower part being packed with iodoform gauze. The edges of the incision are covered with a sticky, blood-stained, not distinctly purulent exudate which lightly agglutinates the edges. The parietal peritoneum is bound by light, recent fibrinous adhesions to the congested and distended intestinal loops over the lower zone of the abdomen. The omentum is spread out and covers the upper half of the cavity, and it is free from old adhesions. Both of its surfaces are covered with an opaque exudate. The intestines generally present small subserous ecchymoses, and they are covered by a fibrinous exudate, becoming much thicker at the edges of contact of the loops. The fibrin is thickest over the loops of the intestine which occupy the pelvis.

The uterus is bound by old adhesions to the bladder in front and the rectum behind. The left Fallopian tube is involved in dense adhesions; it is dilated and bent upon itself. The ovary is also enclosed in adhesions, and it occupies the recess formed by the bending of the elongated tube. In its entire length this tube measures 15 cm. It is smallest at the uterine extremity (size of little finger) and largest at the fimbriated end (size of thumb). The fimbriated extremity is hidden in the adhesions. The contents of this tube are clear and watery. On the right side there is a dense mass of adhesions in which is enclosed a cavity lined with smooth walls, the contents of which are slightly turbid fluid. At one extremity of this there is a pedunculated hydatid the size of a pea. The former represents the remains of the ovary. The right tube is less enlarged and it is buried in adhesions; it contains clear and thin contents. The cavity of the uterus is normal in size; the mucous membrane is velvety.

There is no pneumonia; the pleura is, however, covered at the base of the lungs, on each side, with a tolerably thick layer of fibrin. A similar layer also covers the diaphragm, but not completely. This exudate in the pleura was produced by the extension of the inflammatory focus through the diaphragm.

The jejunum is distended; in its upper portion it is less congested than the remainder of the intestine. The upper part of the ileum, which is distended throughout, shows only a slight congestion of the mucous membrane; but as the intestine is descended the congestion increases, although even here it is not uniformly present. Beginning 75 cm. above the ileocæcal valve, the mucous membrane of the intestine is diffusely congested, it is swollen and presents small hemorrhagic points. In this situation the surfaces of the valvulæ conniventes are covered with a heavy yellow fibrinous exudate, the intervening mucosa being covered with a lighter granular exudate. This area extends for a distance of 45 cm., leaving a stretch of intestine of 30 cm. above the valve free. The cæcum is greatly congested, it presents foci of necrosis and exudation which are stained with bile. In the ascending colon the follicles are enlarged for a distance of 20 cm., and the mucous membrane about them is swollen and ecchymotic. A fibrinous exudate is also present here.

The bacteriological examination of the exudate in the peritoneal cavity at the time of the exploratory incision showed one species only of micro-organisms, namely, a capsulated diplococcus. The same organism was isolated from the abdominal cavity and from the exudate in the pleura at the autopsy. No other species could be found, and this one was proven to be the micrococcus lanceolatus. Cultures were also made upon agar-agar from the fibrinous exudation in the intestine. A diplococcus similar to the one found in the peritoneum was isolated.

Animal experiments.—A mouse was inoculated into the root of the tail, at the time of the autopsy, with a small quantity of the exudate from the pleura. It died on the 3d day. Locally there was an œdema which contained many typical capsulated diplococci. In addition there were an acute fibrinous pleuritis and pericarditis, in both of which the same species of organism was contained. A second mouse was inoculated subcutaneously with a small amount of the growth upon an agar-agar culture, derived from a single colony from the plates made from the exudate in the intestine. It died in 2½ days. From the local process and the peritoneum of this animal many capsulated diplococci were obtained.

The study of the hardened tissues taken from both the large and small intestine showed the diphtheritic process to consist of a necrosis of the epithelial layer and the subjacent glands in the mucosa, upon which and in which a pseudo-membrane containing fibrin, leucocytes, detritus and bacteria was deposited. The leucocytic infiltrations extended into the depth, often filling the gland lumina, appearing between the glands, in and beneath the muscularis mucosæ, and in a variable amount being present in the the submucosa. The capillary blood-vessels in the mucosa were invariably hyaline and thrombosed in the areas of necrosis with pseudo-membrane formation, but sometimes in other places as well. Actual hemorrhages had taken place here and there into the mucous membrane. The submucosa showed a varying picture. In the congested and pseudo-membranous areas generally it was swollen. At times this swelling was an œdema in which only a few emigrated cells were visible; at other times much fibrin was present in it, with at the same time either few or many emigrated cells. The muscular coat was quite free from infiltration with fluid or cells. Sections stained with Weigert's fibrin stain brought out the bacteria in addition to the fibrin. As a matter of fact, although with the hematoxylin and eosine staining much fibrin was found to be present, yet by the former method some unsuspected areas came to view, and notably the material occluding many of the capillaries in the mucosa took on a vivid blue stain. In the false membrane many bacteria were found, and among these diplococci were easily distinguished. Corresponding with the situations of the false membrane, the bacteria could be traced into the glandular layer, both inside and between the glands, and they reached nearly but not quite to the muscularis mucosæ. However, in other situations in which no pseudo-membrane was present bacteria had passed into the substance of the glandular layer. In the deeper parts only two species could be distinguished, a diplococcus and a short bacillus, the latter often staining irregularly. The former predominated. Bacteria were not found to pass through the muscularis mucosæ, they were not found in the submucosa among the cellular infiltration, nor in the œdematous and fibrinous portions. Diplococci were only

very exceptionally found in spaces (lymphatics?) in the subserous coat, less often in the intermuscular fibrous fasciculi. There was no evidence therefore of a continuous growth through the intestinal coats. There was evidence, however, of a transportation by the lymph current. Upon the peritoneal surface great numbers of the characteristic diplococci were found.

The especial interest in these cases concerns first the nature of the micro-organisms causing the acute peritonitis; second, the demonstration of their invasion from the intestine in the absence of perforation, and third, the part believed to have been played in the one by a chronic dysenteric process, and in the other a chronic peritonitis, in rendering the peritoneum susceptible to the action of the introduced micrococcus lanceolatus.

A RAPID METHOD OF MAKING PERMANENT SPECIMENS FROM FROZEN SECTIONS BY THE USE OF FORMALIN.

By Thos. S. Cullen, M. B.

Any one who has hardened tissues in formalin will be impressed with the rapidity of its action, with the firm consistence of the tissue, and with the absence of the contraction of the specimen so often seen when alcohol is used as the hardening medium. Microscopical examination of a specimen hardened in formalin, as we all know, shows almost perfect preservation of the cellular structure. Recently it occurred to me that formalin might be used in the preparation of frozen sections.

One of the greatest difficulties experienced in rendering frozen sections permanent lies in the fact that when passed through alcohol the section frequently not only contracts but contracts irregularly, distorting the specimen; further, such specimens will often stain imperfectly. The use of formalin will obviate these difficulties, allowing one to make an excellent permanent specimen from the frozen section. My method is as follows: The tissue to be examined is frozen with carbonic acid or ether and then cut; the sections are then placed in 5 per cent. watery solution of formalin for 3 to to 5 minutes, or longer if desired; in 50 per cent. alcohol 3 minutes, and in absolute alcohol 1 minute. The tissue is now thoroughly hardened and can be treated as an ordinary celloidin section, being stained and mounted in the usual way. On examining this mounted section one might readily take it for a well preserved alcoholic specimen. Supposing we stain with hæmatoxylin and eosin, the entire process is as follows:

a. Place the frozen section in 5 per cent. aq. sol. formalin for 3 to 5 minutes.

b. Leave in 50 per cent. alcohol 3 minutes.

c. In absolute alcohol 1 minute.

d. Wash out in water.

e. Stain in hæmatoxylin for 2 minutes.

f. Decolorize in acid alcohol.

g. Rinse in water.

h. Stain with eosin.

i. Transfer to 95 per cent. alcohol.

j. Pass through absolute alcohol, then through either creasote or oil of cloves, and mount in Canada balsam.

The blood is lost in frozen sections. To overcome this Prof. Welch suggested that the specimen be first fixed in formalin and then frozen. I tried this and found that we were able to preserve the blood, but that it did not stain very distinctly. For convenience this second procedure will be called method II. The essential factor is the same in each case. The latter process, however, requires at least two hours. A small piece of the tissue is thrown into 10 per cent. solution formalin for two or three hours. It is then put on the freezing microtome and thin sections can be readily made. The sections are stained in the usual way. The detailed procedure of method II is as follows:

a. A piece of tissue 1x.5x.2 cm. is placed in 10 per cent. aq. sol. formalin for 2 hours.

b. Frozen sections are made.

c. Left in 50 per cent alcohol 3 minutes.

d. In absolute alcohol 1 minute.

e. The sections are now run through water and stained in hæmatoxylin for 2 minutes.

f. Decolorized in acid alcohol.

g. Rinsed in water.

h. Stained in eosin.

i. Transferred to 95 per cent. alcohol.

j. Passed through absolute alcohol, then either through creasote or oil of cloves, and mounted in Canada plug balsam.

For ordinary use method I is all that is required. Given a piece of tumor from the operating room, it is possible to give as definite a report in 15 minutes as one would be able to give after examining the alcoholic or Müller's fluid specimens at the expiration of two weeks. Method II is of especial value in the examination of uterine scrapings. Instead of putting them in the 95 per cent. alcohol in the operating room, they may be immediately dropped into 10 per cent. aq. sol. formalin. By the time the pathologist receives them, which is at least two hours afterwards, they are firm enough to be frozen without difficulty, and permanent sections can be immediately made. The second method is to be recommended for all delicate tissues. In employing these methods one must remember, as for example in epithelioma, that some of the cell-nests will drop out, there not being anything to hold them *in situ*, as there is when celloidin is used. We have, however, hardened and stained epithelioma of the cervix by this method without the slightest difficulty.

THE CONDITION OF THE GEMMULES OR LATERAL BUDS OF THE CORTICAL NEURODENDRON IN SOME FORMS OF INSANITY.

A PRELIMINARY NOTE.

By Henry J. Berkley, M. D.

In the early years of the chromate of silver methods, the protoplasmic extensions of the nerve cells were considered to be of comparatively little importance in comparison with the cell body and axis-cylinder process. Golgi thought their function to be principally nutritive, and that they had junctures with the vascular glia and blood-vessels, while Nansen went to the limit of denying to them the property of nervous function, relegating it entirely to the axis-cylinder.

The discovery that the axis-cylinder was occasionally an offshoot of one of the protoplasmic processes at some distance from the cellular body was a powerful factor in producing an alteration in these views, and to-day the cell branches are regarded as an essential portion of the nervous apparatus, having an almost equal significance in the production of the nervous impulses with the cell body; hence the now universal adoption of the name neurodendron, or neurodendrite, for the branches.

With the neurodendron, the lateral buds, or gemmulæ, have gradually acquired more and more significance. Kölliker in 1891 looked upon them as artifacts, while in various recent reviews of the nerve cell they are disregarded entirely, or their presence is simply mentioned, for they are considered to be of no import in the economy of the nerve cell. More recently, however, Lenhossék testifies to their constant presence in silver preparations, and has actually demonstrated them in fine Nissl preparations. Cajal and Retzius also admit their universal presence on the dendrites of the pyramidal cells of the cerebrum and the Purkinje cells of the cerebellum. None of the writers who mention them at all advance a theory as to their nature, beyond that they are possibly chromophile particles attached to the sides of the dendrons, nor do they attach much significance or importance to them.

Another point in regard to the gemmules is that they are supposed to be much more prominent in early than in adult life; an idea which, in view of recent developments in the histology of the nerve cell, seems to be disproved. The probable truth of the matter lies in the circumstance that the earlier chrome-silver methods only stained the buds very imperfectly, or in a manner not sufficiently striking to direct much attention to them, the rounded knob at the free extremity commonly being more definitely stained than the stem.

However, recent methods of obtaining silver impregnations have brought them out more and more clearly, until now they form an important portion of the picture of nearly all of the cortical cells.

I have recently observed, by means of a new and seemingly constant method of silver staining in a number of slides from cases of chronic alcoholism, and from demented subjects, a distinct alteration in these gemmulæ that foreshadows the discovery of a class of pathological lesions of the brain cells which we have hitherto not been able to see by any mode of nerve-cell staining in possession of the pathologist. The cases from which we have drawn are still few in number, nine in all, from the cerebra of seven alcoholics and two dements; but the changes have been always present; and more important, in the brains of several rabbits which had been subjected to the ingestion of considerable quantities of alcohol, the differences between the dendrons of the control and those from the alcoholic brains were most striking, for not only were lesions present, but they were invariably constant. It is true that these changes form only a portion of the lesions of the nerve cell, but being the most prominent they at once attract attention.

Briefly, in both alcoholics and dements they consist in a diminution of the lateral buds, proceeding in well advanced cases to a total disappearance of the short side processes. Not only does this change affect the larger pyramidal cells, but also the smaller angular and irregular ones, and eventually ends in a lessening in size of the protoplasm of the dendron, besides the stripping of the buds from its sides.

It would seem that by the use of this new method of staining—the phospho-molybdate of silver in free nitrate of silver—which offers a constancy and fineness of detail before unattainable in pathological preparations, that we have almost passed the borderland of the uncertainty of mental disease, and will be able to relegate, in the fullness of time, all decided mental changes to the same definite category in which we are now able to place the formerly obscure diseases of the nervous system, whose lesions are now more or less thoroughly understood, and place psychiatry upon the same footing as many of its sister branches of medicine that rest upon a secure pathological basis.

REPORT IN GYNECOLOGY, III.

By T. S. Cullen, M. B.

I. Hydrosalpinx, its Surgical and Pathological Aspects, with a report of twenty-seven cases.
II. Post-operative Septic Peritonitis. Numerous plates.

REPORT IN DERMATOLOGY, I (in press).

Containing Protozoic Dermatitis, Molluscum Fibrosum, Urticaria, etc. By T. C. Gilchrist, M. R. C. S. Many Illustrations.

PROCEEDINGS OF SOCIETIES.

THE JOHNS HOPKINS HOSPITAL MEDICAL SOCIETY.

Meeting of January 21, 1895.

Dr. Abel in the chair.

Exhibition of Specimens: Cases of Tuberculosis.—Dr. Flexner.

1. Primary tuberculosis of the serous membranes involving the pleura and peritoneum. Tuberculosis of the mediastinal, pericardial, tracheal, bronchial, peritoneal and retroperitoneal lymphatic glands. Perforation of an adherent bronchial gland into the bronchus. Extension of tuberculosis from the peri-pancreatic tissue into the pancreas. Tuberculosis of the intercostal muscles. Healing infarction of lung.

The patient was a colored man, 35 years old, who dated his last illness from October 3, 1894. He was admitted into the medical wards of the hospital, October 13, 1894; he died December 6th at 2 A. M. At the meeting at which the specimens from this case were exhibited, Dr. Osler made the following remarks upon them: "On admission the patient had high fever, but nothing was to be discovered locally except the involvement of the pleura. A slight effusion into the left pleural cavity occurred, and the aspirated fluid, which was clear, gave negative results in cultures. Subsequently the case changed very much in character. Instead of a continuous fever it became extremely irregular and intermittent, and for nearly ten days there was intermittent pyrexia. For 8 to 10 hours out of the 24 the temperature not only fell to normal, but subnormal, indeed down to 97° or even 96°. Two or three weeks after his entrance into the hospital he began for the first time to have abdominal trouble. No especial tenderness was present, but the abdomen became large, and distinct areas of induration made their appearance. One of these lay transversely across the upper portion of the abdomen, and this we thought was the thickened omentum. Taking the pleurisy and involvement of the peritoneum into consideration, we thought the diagnosis of tuberculosis tolerably certain in spite of the absence of any local indications of tuberculosis. The patient had no cough, and no expectoration came from the lungs. He had a small amount of mucoid expectoration, which was carefully examined and found negative. The day before his death, as I was dictating a note upon his case, my attention was attracted to a nummular mass of sputum in the basin at his bedside. It was so unlike anything that had been previously seen that I asked the nurse if it had come from this patient. She said it had. It was at once examined and found full of tubercle bacilli. The patient had no involvement of the lungs, and, as the autopsy showed, the bacilli came from a softened lymphatic gland which had perforated into one of the bronchi."

The main features of this case are as follows: *The left lung and pleural cavity.*—The left lung is bound in places by firm adhesions to the costal wall. The two layers of the pleura are much thickened and contain large and small tubercles. The two layers are not everywhere in contact, and where they are separated, stringy masses of fibrin run from one surface to the other. A small amount of fluid occupies these spaces. The pleura covering the diaphragm is also much thickened, and to this the lung is firmly attached. On section, the lung is dark in color, it is not entirely airless, and it is entirely free from tuberculous infiltration. The vessels and bronchi are free. The *larynx and trachea* are free from ulceration. There are adhesions between the right bronchus just below the bifurcation and a packet of enlarged and tuberculous lymph glands. In this bronchus, 2 cm. below the bifurcation, affecting the division going to the lower lobe, there is a perforation due to the softening of one of the adherent glands. The surface of the bronchial mucous membrane corresponding to this is covered with necrotic material easily removed, and the blood-vessels of the adjacent mucous membrane are congested.

The *right lung and pleura* are free from tuberculous infiltration; but in the lower lobe of this lung there is a consolidated area as large as a hazel-nut, of a brownish-red color centrally, and a paler peripheral portion, which proved to be an infarction partly decolorized and undergoing organization.

Intercostal muscles.—Beneath the fascia covering the intercostal muscles are small tubercles and several larger caseous areas. The largest equalled a pea in size. The masses are imbedded in the muscle substance, as shown by the microscopical examination.

Peritoneal cavity.—The abdominal wall is bound by firm adhesions to the omentum, and the omentum in turn to the visceral layer of the peritoneum. The omentum extends over the entire front part of the cavity of the abdomen, descending to the superior surface of the bladder and extending well into the lateral regions of the cavity. The omentum is much thickened, the thickening being greatest over the site of the transverse colon. This thickening is due to the development of discrete tubercles and diffuse tuberculous tissue within its substance. The peritoneal covering of the intestines contains many discrete tuberculous masses, yellow in color and opaque, resembling those in the omentum. The intestines are matted together by these as well as by a stringy, yellow fibrinous exudate. The parietal peritoneum is covered with similar tubercles, and the vesico-rectal fossa also. All the viscera are surrounded by a tissue containing tubercles and tuberculous tissue, and thus firmly bound to adjacent structures. The under surface of the diaphragm is studded with tubercles and firmly united to the liver.

The *pancreas* is involved in a firm mass of adhesions, and in the region of the duodenum its substance for a distance of 3x3 cm. is invaded by a tuberculous growth. This mass is of an opaque, yellowish color. Upon microscopical examination it is composed of caseous material, and in the edge next the pancreas discrete tubercles are visible in the granulation tissue there present. The gland acini are very indistinctly visible in the caseous area, and they are fast disappearing from the advancing edge of tuberculosis.

2. Phthisis pulmonalis with the formation of large trabeculated cavities. Tuberculous bronchiectatic cavities. Tuberculosis of epididymes, testicles, seminal vesicles, prostate gland, bladder and kidney. Adhesion between the left semi-

nal vesicle, prostate and urethra, perforation of the urethra. Tuberculosis of liver, spleen and adrenal glands.

The patient, a colored man, was admitted into the medical wards of the hospital (Prof. Osler), December 14, 1894. The present illness was dated from July, 1894. The physical examination indicated a large cavity in the left apex, and also a cavity on the right side. Behind the right testicle an enlargement, apparently connected with the epididymis, was felt. The sputum contained many tubercle bacilli.

Lungs.—The upper lobes of both lungs contain large trabeculated and communicating ulcerative tuberculous cavities. In the left lung there are several bronchiectatic cavities as well.

Adrenal glands.—The left is much enlarged; its dimensions are 8x3.5x1 cm. It is surrounded by adhesions. On section it is found to be converted into a firm caseous mass. The right adrenal measures 4x3x1 cm., it is also involved in adhesions, and on section shows a similar tuberculous transformation.

Scrotum, epididymes, testicles, seminal vesicles, prostate gland, urethra, bladder and kidneys.—On the left side of the scrotum there is a small fluctuating mass the size of a walnut which is not distinctly connected with the testicle. The skin over this swelling is congested and glazed. On section this proves to be an abscess cavity containing caseous pus. The epididymes are much enlarged and tuberculous, and on the left side there are adhesions between the epididymis and the scrotal tissues corresponding to this abscess. In the testes are scattered grey and firm tubercles. The seminal vesicles are enlarged and tuberculous. On section of the left one it is found to be converted into a thickened and indurated mass containing a central cavity filled with softened caseous material. The walls of this cavity are almost of cartilaginous hardness. Between the enlarged vesicle and the prostate gland an adhesion had taken place, and the softening of this part of the wall of the vesicle has extended into the prostate and through it to the urethra. Thus a perforation of the urethra 2 mm. in diameter, which is situated in the prostatic portion to the left of the verumontanum, had taken place. This perforation communicated with the cavity of the vesicle. The right seminal vesicle is converted into a caseous mass which has just begun to soften. The mucous membrane of the bladder is, in general, pale. Just above the neck of the bladder the mucous membrane is œdematous, and this œdematous condition extends to the lower angle of the trigonum. In the mucous membrane corresponding with this œdema are small, elevated, opaque nodules of the size and general appearance of miliary tubercles. Descending, these nodules become more numerous and a little larger in the mucous membrane of the prostatic portion of the urethra, and here there is considerable congestion of the mucous membrane. The kidneys are swollen, the capsule is removed with difficulty, and minute hemorrhages are evident in the substance of the organs. Each kidney presents a tuberculous nodule as large as a walnut, which is located for the most part in the pyramidal portion, but extends into the cortical part as well.

Notwithstanding the tuberculosis of both adrenal glands, there were no symptoms or other indication of Addison's disease in this case.

An Ideal Result following Double Tenotomy in a Case of Convergent Strabismus.—Dr. Theobald.

This case is of interest for several reasons. In the first place the squint was of very high degree; in the second place it had existed some 33 or 34 years; and thirdly, the result obtained was exceptional.

Before describing the case it will be well to say a few words as to the difficulties which beset us in obtaining good results in squint operations. No operation for squint is perfectly successful unless it restores binocular vision. The restoration of binocular vision would be a very easy matter in almost all cases but for one thing—after an eye has squinted for some time it almost invariably becomes more or less amblyopic. As the squint develops it is, at first, intermittent; the eye squints in, from time to time, during accommodation perhaps, and at other times is straight. With each turning in of the eye there occurs double vision. This double vision produces so much annoyance that the brain at once begins to shut out the vision of the squinting eye, and as a result of this a marked amblyopia soon develops in this eye. It is this amblyopia which often makes it a difficult matter to bring about binocular fixation after tenotomy. We very often find, after an eye has been squinting for some time, that its fixation is eccentric; in other words, if we close the non-squinting eye and direct the patient's attention to some object, he will not look directly at the object, for the vision of the macula region is not so good as that of some eccentric portion of the retina, and hence he prefers to direct this eccentric portion of the retina towards the object he is regarding. I have seen cases where, after a tenotomy, the muscular balance was almost perfect, and yet the eye which previously had squinted seemed to have no disposition whatever to follow the movements and to fix with the other eye, the whole tendency to binocular vision seemingly having been destroyed, the eye squinting sometimes in a little and and again out a little whilst the other eye was fixing a given object.

This question of the amblyopia of squinting eyes is one that has attracted a great deal of attention in recent years. Donders and Von Graefe, and the authorities of their time, accepted the view to which I have just referred—that the amblyopia is produced by the squint; that when the eye begins to squint there is so much confusion from the double vision that the brain shuts out the vision from this eye, and that in time amblyopia is produced as the result of this. This was the view generally accepted until a comparatively short time ago, when Schweigger and Alfred Graefe advanced a different view. They held that instead of the squint being the cause of the amblyopia, the amblyopia was the chief cause of the squint; that the amblyopia was congenital, and that the amblyopic eye having little capacity to fix with the other eye, was prone to become strabismic. This view is the one which at the present time probably receives the most general acceptation. It has not commended itself to my judgment, however, and in 1886 I wrote a paper, published in the transactions of the American Ophthalmological Society, bearing upon this question—whether the amblyopia was dependent upon the squint or whether the squint was dependent upon the amblyopia. A significant point which I laid stress upon at that

time is this: the exact location of the amblyopic area in the retina of the squinting eye. When an eye first begins to squint there are two images in it which are especially troublesome. One is the image of the object which the individual is regarding with the non-squinting eye, and which of course is formed upon an eccentric portion of the retina of the squinting eye; the other is the image which happens to fall upon the macula region of the squinting eye. The former is the image which causes the individual to "see double"; the latter is especially annoying because it overlies and is mentally confused with the image of the object which is being regarded by the properly-directed eye. These are the two images which must be suppressed if the individual is to enjoy even tolerable visual comfort. For this reason there are two portions of the retina of the squinting eye, supposing the amblyopia to be the result of the squint, where we should expect the amblyopia to be most marked. These two portions are the macular region of the squinting eye, because there the individual must get rid of the object which is seen confused with the object he is looking at; and the other is that portion of the retina in the squinting eye which receives the image of the object which in the properly directed eye is formed upon the macula. In convergent squint the part of the retina in question lies to the nasal side of the macula, while in divergent squint it lies to the temporal side. Now this is exactly what we find to be the case in squinting amblyopic eyes. The macular region is found to be highly amblyopic, and in convergent squint the inner portion, and in divergent squint the outer portion of the retina. This to my mind is almost conclusive evidence in favor of the view that the amblyopia is really produced by the squint.

Since my paper was read in 1886, several very interesting cases have come forward bearing upon the question at issue. One is a case reported by Dr. Roosa. Schweigger makes the point that no case has ever been reported where a person has been known to have had normal vision in an eye which has afterward squinted and become amblyopic. It would seem that there should be dozens of such cases. Such is not the fact, however. The reason is that concomitant squint almost always develops in early childhood, usually before the age of five years, and, as may be supposed, the occasion and the opportunity to test the vision before this age rarely presents itself; furthermore, it is almost impossible to test the visual acuteness with any degree of satisfaction at so early an age. Dr. Roosa has reported, however, in his recently published work upon eye diseases (p. 549) a case of this character. A girl seven years of age was brought to his office and was found to have practically normal vision in both eyes. Ultimately she developed a squint, and later on was brought back again, and the squinting eye was then found to be decidedly amblyopic.

A still more interesting case was reported by Dr. W. B. Johnson, of Paterson, N. J., to the American Ophthalmological Society. Here the reverse happened—an individual who had been extremely amblyopic in a squinting eye regained normal vision in it. The significance of this case is, that if the amblyopia had been congenital the vision would certainly not have been regained in the way it was. The facts in this case were these: A man, 19 years of age, had squinted in his left eye since three years of age. The other eye was good. In the squinting eye he could only count fingers at six inches. He visited Dr. Johnson just before the accident about to be related occurred, and his vision was tested with the result stated. A few days afterward he received an injury in the normally directed eye, from a piece of steel or iron, and the eye had to be enucleated. This left him only with the previously squinting and highly amblyopic eye. The case was carefully watched and studied by Dr. Johnson. The day after the enucleation of the injured eye the patient expressed himself as seeing better already with the squinting eye. Seven days after the accident the vision had increased from counting fingers at six inches to $\frac{2}{20}$. Thirteen days afterward, with a +1.75 glass, he was able to read Jaeger No. 9. Eighteen days after the accident he had full normal vision, and this condition lasted when he was last examined three years afterwards. This case was regarded by members of the Ophthalmological Society as having an important bearing upon the question of the origin of amblyopia in squinting eyes. The amblyopia in this instance was certainly acquired, because, if congenital, vision would not have been restored as it was. These two cases have especially interested me because they so strongly sustain the view which I argued in favor of a few years since.

The case I wish to speak of was that of a man 37 years of age. His right eye squinted strongly inward. His strabismus was due to a fall and had existed 33 or 34 years. The origin of the squint is significant. Where a squint develops as the result of a fall it is almost necessarily a paralytic one and manifests itself quickly. It does not go through the usual stages of a slowly developing concomitant squint, as previously described. In paralytic squint good vision is more likely to be retained in the squinting eye than in concomitant squint, for as the squint is usually of high grade and forms quickly, it is not so essential that the amblyopia should be developed in order to rid the individual of the annoyance of double vision. This patient had normal vision in his left eye and $\frac{2}{20}$ vision in the squinting eye. He consulted me in September, 1894, but did not consent to have his eye operated upon till March of the present year. I did a very free tenotomy of the right internal rectus. I not only cut the tendon proper, but also divided very freely Tenon's capsule. After this operation there was still a considerable residual squint left. Three days afterward I did a free tenotomy of the internal rectus muscle of the opposite eye. After free division of the tendon and free section of Tenon's capsule there was still a slight residual squint, so I introduced a conjunctival stitch and attached it to a plaster strip on the temple. The first operation was done March 8th, the second March 11th. On March 12th, after the removal of the stitch, I found he had binocular vision, and here came the especially interesting feature of the case. Usually in making our tests of the lateral balance of the muscles we find that in distant vision, a four or five degree prism, base up or down, will produce a degree of vertical diplopia which the eyes cannot overcome. This man's eyes were so intent upon maintaining binocular vision that it was necessary, even the very day after the second tenotomy, to use a vertical prism of seven to eight degrees in order to keep the images apart. With a prism of four or five degrees the eyes

would blend the two images at once. The lateral muscles were tested in this way, and there was found to be an insufficiency of the external recti muscles varying from 1° to nothing. On March 15th I found it necessary in the vertical diplopia test for distance, to use a nine degree prism to prevent the eyes from merging the two images, and in the near test it was necessary to use one of eleven degrees. There was lateral orthophoria, both in the distance and in the near, and no hyperphoria. When the eyes of this individual were once put in such a position that binocular vision was possible, they seemed to be much more intent upon maintaining it than normal eyes usually are, although they had been squinting for 33 or 34 years and during all this time had never known what it was to work harmoniously. This very unusual feature of the case is what seemed to make it worth reporting.

NOTES ON NEW BOOKS.

Therapeutic Suggestion in Psycopathia Sexualis. By Dr. A. von Schrenck-Notzing. Translated from the German by Charles G. Chaddock, M. D. (*The F. A. Davis Co., Philadelphia.*)

The last decennary has been productive of a kind of noxious medical literature that may be likened to the works of Zola and other writers of a similar school in the world of fiction. Most unfortunately, it was one of the best known of the German alienists who, nine years ago, started the craze for the word-painting of abnormal sexual instincts, and since that date his work has passed through seven editions in the mother-tongue, besides a number of translations. The extensive demand for this class of literature cannot come from the medical profession, few of whom are interested in sexual anomalies; and for such morally detrimental books to fall extensively into the hands of the laity is but to add fuel to already existing flames; for nothing could be more productive of Scythian morals than to place such works in the hands of the general public, and then—auto-suggestion is all-sufficient to produce a heavy increase in the clientèle of perverted sexuals.

We have before us, by the English translator of Krafft-Ebing's "Psycopathia Sexualis," another work of similar scope, by a Munich practitioner of medicine, and one of very doubtful utility, for which the only excuse that can be advanced by its author for its creation is that it is a plea for the treatment of sexual derelicts by suggestion. The book is in very large part built up of the remnants of other pseudo-scientific studies by Krafft-Ebing, Hammond and Moll, which may readily have been read in the original and surely do not need to be repeated in all their nauseating nudity.

By far the best written pages in the book are to be found in the chapter on the "history of the development of contrary sexual feelings among the ancients," and the whole chapter constitutes a historical sketch of some value.

There are a number of curious and erroneous expressions in the work, but as we do not happen to have the original at hand, it is impossible to determine whether they belong to the author or translator. Sentences like the following occur, "Automatic masturbation occurs at a certain age in idiotic dements." Sollier would indeed find it difficult to define an "idiotic dement." Another sentence is equally striking: "A variety of weak-mindedness which is caused by an abnormal tendency to immoral acts; a sign of a low grade of idiocy which is known under the name of 'imbecility.'" The author's idea of the idiot and the imbecile can only be said to be widely at variance with that in common acceptance—if nothing more.

The best that one can say for the book, and all those of a similar character, is that they are morally unhealthy, have a tendency to create the very vices they purport to cure, and from every standpoint it were well if they had never been written. H. J. B.

Corrado Parona: L'Elmintologia Italiana da' suoi primi tempi all' anno 1890. (Atti della R. Università di Genova, Vol. XIII, 1894, 729 pgs., 1 map.)

The end of this century is marked in medical zoölogy by a movement on the part of the specialists to collect the entire literature up to date, so that we may start off in 2001 with a full knowledge of exactly what has been accomplished in this field. This movement has been found a necessity, not only from a general standpoint of thoroughness, but because helminthologists are now accepting the "Law of Priority" in order to do away with the great evil of having half a dozen different names for each parasite, and half a dozen different parasites for each specific name. In writing bibliographies in various parts of the field of medical zoölogy a number of men have already rendered great service, but all efforts heretofore made have now been overshadowed by the Italian scientist, Corrado Parona. The work done by this author and published in his *L'Elmintologia Italiana* is so extensive and valuable that one almost hesitates to review it for fear of not giving Parona the full credit due him.

The book is divided into four principal parts: the first part gives a general historical review of parasitology in Italy, beginning with the writings of Plinius and Celsus; the second part covers the classification of the parasites, cross-references being given under every family, genus, species, etc., to all the Italian works in which the forms are mentioned; in part third we find the geographical distribution of the parasites for all the provinces of Italy, the authority being cited in every case; part four is the portion which is of especial value, as it contains full bibliographical references to all Italian articles on parasites, together with short, concise abstracts of each article accessible to the author. In this bibliography we find numerous observations on parasites which have totally escaped the attention of other workers, in all 1146 separate titles being cited.

Particular stress, throughout the entire work, is laid upon the parasites of man, and at the end of the volume a map of Italy is given showing the geographical distribution of the most important helminths infesting the human species.

Should Corrado Parona, to whom we already owe numerous observations in helminthology, never write another word upon the subject, he will, through his *Elmintologia Italiana*, always be known as the man who has done more to bring Italian parasitology to the attention of the world than any other single worker.

Wardell Stiles.

THE MALARIAL FEVERS OF BALTIMORE.

An Analysis of 616 cases of Malarial Fever, with Special Reference to the Relations existing between different Types of Haematozoa and different Types of Fever.

By William Sidney Thayer, M. D., and John Hewetson, M. D.,
Assistants in the Medical Clinic of The Johns Hopkins Hospital.

218 pages, quarto, with plates and charts. Price $2.00, Postage paid.

[Forming part of *The Johns Hopkins Hospital Reports*, Vol. V, 1895.]

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